Gas Journal

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Vol. 210. 87th Year. LONDON, APRIL 10, 1935. No. 3751. Price 1s.

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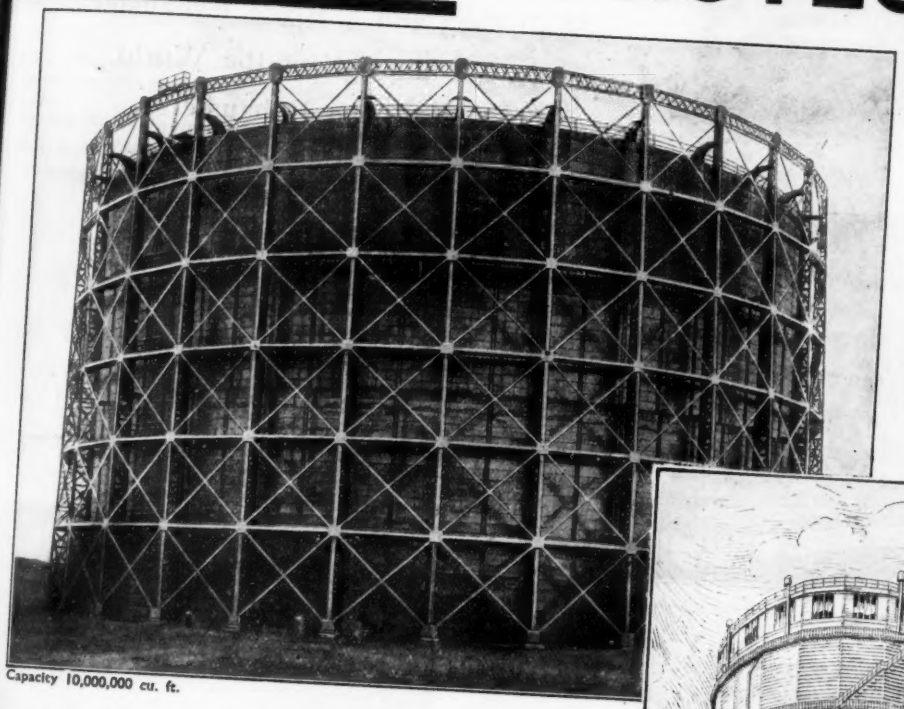

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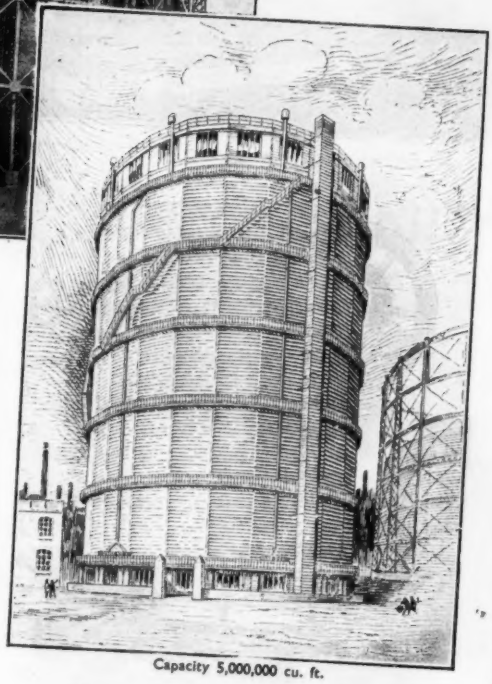

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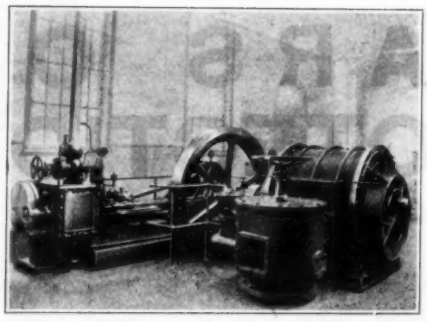

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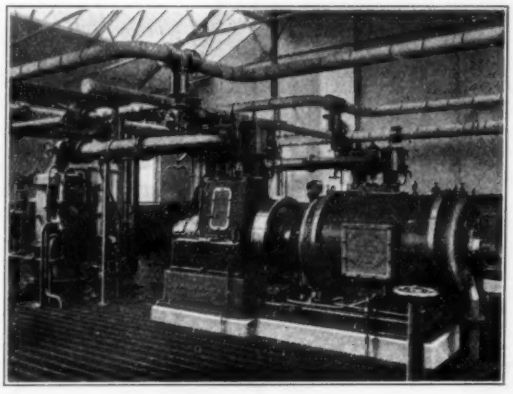

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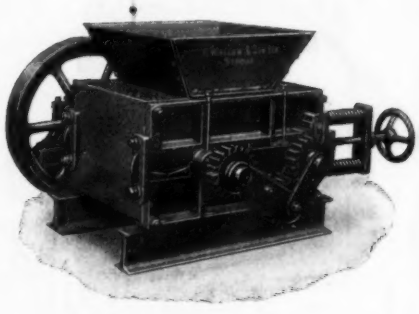

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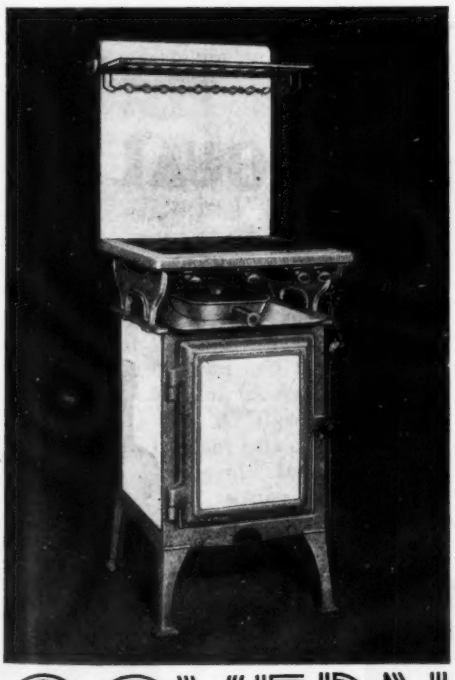

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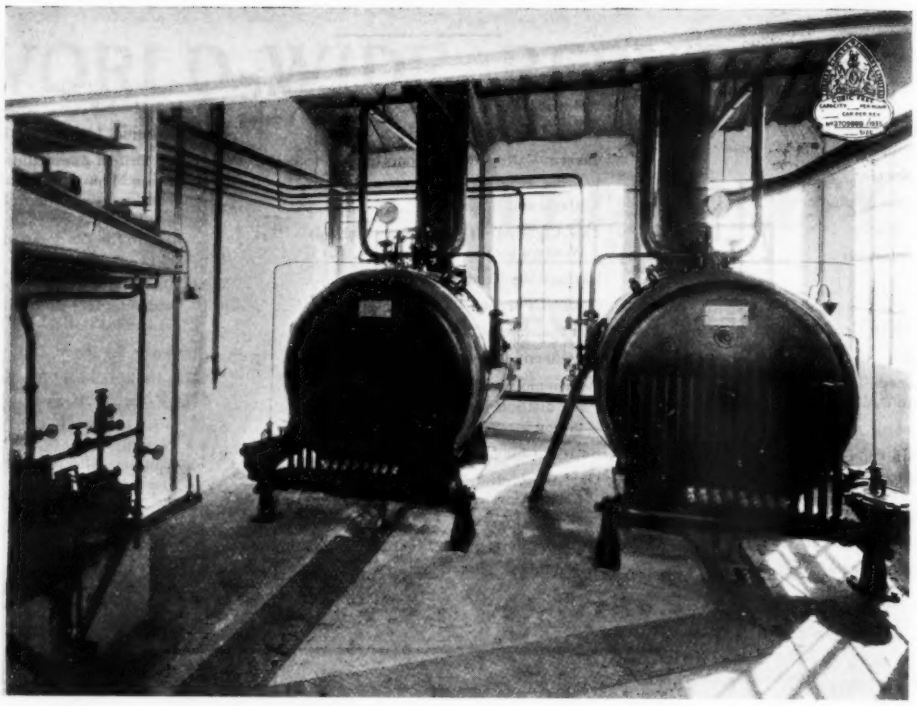

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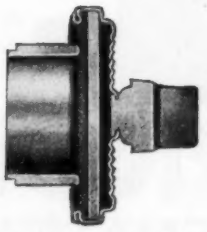

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Gas Journal

APRIL 10, 1935

Vol. 210. 87th Year No. 3751.

Editorial Notes

Selling Heat Service

THERE are signs that the Gas Industry is awakening to the fact that there is a demand for the coke it produces, but not yet does it by any means appreciate the extent of the demand in the Home Market. And, in general—there are notable exceptions—gas undertakings' coke marketing organizations are insufficiently developed. We have recently advocated a National Coke Association and a measure of economic research into the actual conditions and possibilities of the market. We have urged every undertaking to ascertain how the coke sold is divided into the various categories of use, domestic and industrial. This as a first step towards greater drive and more direction in handling coke sales. At the moment the information available is all too vague. We know, of course, that the Gas Industry is exporting less coke. In fact, the export figures for the past few years are highly illuminating, and show clearly enough that the Industry is finding that more profitable markets exist. Our point is, however, that the Industry is not catering for these markets as it should. We say this in full knowledge that certain undertakings are tackling the market with enthusiasm and to excellent effect. This movement must become universal.

Our feeling is that the Gas Industry does not think big enough. It does not believe in itself nearly as much as its possibilities warrant. It indulges far too much in retrospect, instead of looking forward in the confident faith that the Industry as it exists to-day is a very small affair compared with what it can become. A great heat service Industry selling two first-class smokeless fuels, apart from other products; an industry selling smokeless therms—millions of them in gaseous and solid form. This is the idea we must have at the back of our minds. If we are satisfied with the magnitude of the Gas Industry in 1935, we are sadly lacking in imagination. If the Industry properly appreciated its enormous scope there would be a startling transformation in its activities. We should then see wholesale adoption of attractive tariffs, we should see business "risks" being taken, and we should not see and breathe so much smoke. One of the biggest faults of the Gas Industry has been its sales conservatism—as an example, waiting for increased business before offering inducement for increased business; as another example, allowing the coke market to look after itself in the fear that it will retard the expansion of gas sales. There has been far too much timidity, and the result is that the public have gained the impression that gas and coke are on the wane. The truth is that the Gas Industry is only just beginning as a heat service, and this truth should be made known. It is news value.

Looking to the future, we naturally must consider competition from electricity. According to the report of the Central Electricity Board, the provisional figure for the increase in the sales of electricity in 1934 is 14%. This growth in sales has thoroughly excited the daily newspapers and has received an enormous amount of publicity of the type which gas does not gain. In some directions part of the increase will have been at the expense of the Gas Industry. But the figure of 14% will not alarm or discourage gas men, who realize that in the heating field electricity is not a competitor of a live Gas Industry.

A Case for Optional Tariffs

THE practice at St. Andrews Gas-Works is unusual in that carburetted water gas accounts for fully 50% of the total gas manufactured. In view of this it would have been both interesting and helpful if Mr. George Bruce, in his Presidential Address to the North British Association of Gas Managers last Friday, had given some figures of cost of gas production. He does explain, however, that his modern automatically operated plant, employing the back-run process, shows a saving in fuel consumption of 20% compared with that of the first plant installed at his works in 1922. We mention this as typifying the great advances which have been made in the working efficiency of water gas plants during recent years.

Following upon a brief description of the plant at the St. Andrews Gas-Works, and of how activities on the district have brought the distribution system thoroughly up to to date and capable of giving first-class service, Mr. Bruce touches upon several matters of topical importance. He rightly emphasizes the need for doing away with the black cooker, and his ideas on this subject have found practical expression. Already 75% of the cookers on the district are in enamelled finish, and it will not be long before this figure becomes 100%. Which means that Mr. Bruce will

be in a very good position to withstand competition. He was on the right lines, too, in making a complete survey of all consumers and the appliances in use. Such a survey is of the greatest value, and in Mr. Bruce's case it indicates several interesting points. For example, it shows that, even at present prices charged for gas at St. Andrews, gas fires are not by any means regarded as a luxury by prepayment consumers, and it indicates that, if greater inducement were given to prepayment domestic consumers to avail themselves of greater service, then the path would be easy for the salesman. At present there is not sufficient inducement at St. Andrews.

The average consumption per prepayment consumer is 21,000 c.ft. per annum. A reduction in the price of gas of 3d. per 1,000 c.ft. is granted after the first 18,000 c.ft., so that, on average, the prepayment consumer gains a rebate of 9d. a year. Moreover, before he becomes eligible for a further rebate of 3d. per 1,000 c.ft. his consumption must reach 150,000 c.ft. a year. We suggest that there is scope here for an optional tariff. The ordinary consumer is better off in that by burning an average 41,000 c.ft. a year he earns a rebate of 5s. 9d. But here again there is scope for an optional tariff. Added point is given to our suggestion if we take a look at the number of water heaters fixed. Among a total of 2,767 consumers there are only 89 water heaters. Broadly speaking, for every consumer with a gas water heater, there are thirty without; and it seems to us that concentration on this load, with the help of an attractive tariff, could quite well transform the situation. Mr. Bruce concludes his Address with the following sentence: "Let us use all our resources at our disposal to further our Industry, and the result will be prosperity not only to ourselves but to the nation." To our mind one of our most potent resources is some form of tariff other than the flat rate.

Holding Companies

ANOTHER subject of topical interest discussed by Mr. Bruce is that of holding companies, and he has precisely no use for financial promoters. "Company undertakings," he says, "are baffled and perplexed at so many different sets of promoters who during the past few months have been trying to acquire their undertakings, and there has grown a sense of insecurity among managers and directors alike." Readers know our views on the question of holding companies, but we may well quote a passage from the "JOURNAL" three weeks ago. We said that the Gas Industry will stand or fall by public opinion—by the goodwill or otherwise of its millions of consumers. Those who are now controlling its destiny must put first and foremost the confidence of the public, a solid confidence built up by a century and a quarter's service. Anything which tends to undermine this confidence will have a swift and unpleasant reaction. By the same token those who, from without the Industry, may in the future cast covetous eyes upon the steadiness of gas supply as an investment for surplus funds, and be prepared to bid tempting prices for existing undertakings, will do well in their own interests, as well as of those of the Industry in general, to give heed to the fact that so much of its success may have been due to the public knowledge that "shackles" existed in plenty. But we would like chapter and verse for Mr. Bruce's assertion that gas combines are generally run by people who have interests in the different products which are required for gas undertakings, and that in these circumstances it is difficult for those who have direct control in purchasing materials to get the best terms for the undertakings. This does not tally with our information, and we think that, in fairness to the existing "combines," Mr. Bruce should amplify his sweeping generalization by giving concrete facts.

At the same time we admire the courage of Mr. Bruce in coming into the open and emphasizing with such force the dangers to our Industry of its control passing into the hands of financiers who, to put it bluntly, know nothing whatever about it. The likelihood of this control passing out of the hands of those who, definitely gas-minded, have served the Industry faithfully, with the welfare of the consumer always in mind, can only be viewed with grave alarm. Throughout its long history the consumer has been considered, and to regard him as a pawn in the game of quick profits is hardly the way to ensure success for gas. The younger men in the Industry, which under its present administration holds out such excellent prospects for them, should pay the closest heed to this important matter, as well as those who are likely to be affected in the immediate future. The words of Mr. Bruce constitute a warning which must not be ignored.

The Cost of Gas Appliances

FASHIONS change in advertising as in most other matters, and those who observe the announcements in the daily and magazine Press may have noticed a very interesting recent tendency. The clever people who write the copy are very largely adopting a somewhat novel line on the price question and, instead of holding out inexpensiveness as a blandishment, they are boldly announcing that "our boots cost, of course, a little more in the first instance, but, &c.," or "pay a little extra for your hat and get a good one."

The psychological reasoning which prompts this line of advertising is obvious enough. It recalls to us, too, the reasoning of Quidnunc in a "JOURNAL" article recently, to the effect that it is unsound to set out to sell gas lighting on the "cheapness" appeal alone. What is more expensive may easily, in the long run, be worth paying for—but not necessarily. On the other hand, the snob appeal is strong, and there are many who think that because anything costs more it must be better.

But actually the line of thought to which the current fashion in advertising leads us at the moment is neither of the above. It is to Mr. H. James Yates' words, in his Chairman's speech at the Radiation meeting last month, on the price of appliances, and to the whole question, in fact, of the cost of domestic gas apparatus. Expanding sales, said Mr. Yates, had enabled his Company to introduce many improvements in apparatus without increasing selling prices. Now those who, like ourselves, believe that there really is science behind salesmanship (however much they may have tired of the word) will, we think, be quite prepared to go forth and demonstrate, with Mr. Yates, that research has always ensured a continually improving standard of gas appliance; that the latest products are better than ever; that, in spite of this, prices have not been raised. They will be satisfied, in fact, to sell on quality, even pointing out quite definitely, if you wish, that prices might have been lowered, but not for so good an article.

The opposite view we can certainly understand, even if we cannot admire it. "Give us cheaper and still cheaper gas appliances. They are much easier to sell." It may be so, but frankly, in the interests of the Industry as a whole, as well as of the individual undertaking which adopts this viewpoint, we do not favour any move which would sacrifice quality to price. It may be easier to make a sale of a low-priced appliance in the first place, but if the lower price means less satisfaction in use to

the consumer, and inefficiency or shabbiness in a few years' time, the next sale is going to be immeasurably more difficult, even if in the meantime the user has not been converted to some other fuel.

Let us not be misunderstood. In the interests of gas we join heartily in the demand for gas appliances at as low a cost as possible—but we must have efficient appliances all the time. We do not think we should arrive anywhere if the manufacturers decided, for example, to cut off their research work in order to lower the price of apparatus, or to offer, in these days when appearances count so much, shoddy appliances which would lose their bloom after a few months' use. On the other hand, there can be no more discouraging start to the gas salesman of his day's work than to have to do the best he can with goods which he feels are over-priced. Let him reckon up everything which has been put into the modern gas appliance—research, scientific accuracy, first-class material, national advertising, assistance with local exhibition and display work, and many other factors have to be taken into account—and then let him approach his sale with something of the psychological outlook to which we referred at the beginning of this discussion. His work will then, we believe, be easier.

There is one more point which comes to mind while on this subject. Our chief competitors carry almost to extreme lengths the principle of regarding a domestic appliance, from the supply undertakings' point of view, as a means of selling current. We believe, on the other hand, that there are gas undertakings which take the view that an appliance sale must, of itself, be made to carry a direct profit. If they can get away with this, so much the better, but to those who are troubled by the cost question we commend a serious consideration of these two viewpoints.

According to Plan

For practically four years now there has been in existence a Departmental Committee for the purpose of inquiring into the subject of Garden Cities and Satellite Towns, under the Chairmanship of Lord Marley, and the report which has now been issued as the result of these labours touches upon matters which at one time or another must be in the minds of most of those who are brought up against the haphazard manner in which much of the land and building development at present takes place. How much better would it be for the Gas Industry and other public utility services if there were more evidence of ordered planning, which would permit them to arrange their distribution schemes on better defined lines. Too much regularity in development may not be desirable, though from some points of view it would be preferable to too much irregularity.

The Government are recommended by the Committee to establish a National Planning Board, who should concern themselves with land development throughout the country, and should seek to secure proper distribution and co-ordination of such development, though not themselves actually undertaking it. The Committee are evidently not in favour of what has been witnessed during the past decade—*i.e.*, "the anomaly of the development of large dormitory housing estates without provision for local employment, and at the same time the development of industrial areas without provision for the housing of the workpeople in their vicinity." That, however, is one of the bigger questions; there are also lesser matters that would benefit from the work of the Board. A diminution of "ribbon building," with more general recognition of the fact that, in the case of towns that have reached a certain size, "contiguous growth round the fringe tends to create evils that outweigh any advantages," should simplify the problems, and lessen the cost, of gas supply.

While the Committee do not suggest that there are no circumstances in which it might be desirable to build relatively isolated and detached new towns of the garden city type, they are of opinion that normally it is in the direction of "satellite towns," having an economic bond with existing centres of population, that it will be found most desirable to proceed. What they advocate, therefore, is a definite policy of outward development, taking the form of complete planned units, with due provision for industry, residence, and social services, at some distance from the original nucleus—"a type of development for which the term 'satellite town' is not inappropriate."

Should the Government see fit to appoint a Planning Board, the idea of the Committee is that it should consist of only about five members, and that the Chairman and two other members should devote their whole time to the work of assisting the local authorities to undertake the type of development that is recommended. The report is one which merits consideration without delay, for one can hardly challenge the soundness of the view of the Committee that the time is both ripe and favourable for the serious study of more fundamental methods in regard to the planning of new areas and the replanning of disturbed built-up areas.

The Sales Profession

THERE must be many on the sales side of the Gas Industry—as in every other industry—who feel that the art of selling is worthy of being raised to the status of a Profession, with all that a Profession implies. To these the very stimulating Address which Mr. H. S. Weston gave at the Annual Meeting of Gas Salesmen last Friday will be of absorbing interest—treating as it does in a very practical manner all the main aspects of a subject of growing importance.

The production side have undoubtedly been the most important factor in commerce for many years; but, as Mr. Weston aptly remarked, the day has gone when Production can say, "This is what we can make; go and sell it." And the day has dawned when the sales side can say, "This is what we can sell; go and make it." The production side are able to put imposing letters after their names because they have worked hard and learnt enough to reach a guaranteed standard of efficiency. They have a Profession. But the sales side have no profession, and they never will have until they can convince the nation that salesmanship is worthy of a Profession. The training of the sales director, which is the Mecca of every salesman, is very like the training of a doctor, and, curiously enough, even the terminology in some cases is common to both. For instance, the doctor speaks of "diagnosis of the patient's condition;" the sales experts speaks of "diagnosis of sales weakness." Again, the doctor talks of the "prognosis of a pathological condition;" the sales expert talks of "making a prognosis of a sales curve." The man who aspires to sales direction, said Mr. Weston, must first of all learn the art of carrying the bag and actually making a personal sale. Then he must have a thorough knowledge of the fundamental principles of the hundred-and-one forms of advertising. He must have studied enough psychology to be familiar with its principles—especially those which deal with types of appeal. Perhaps most important of all, he must be familiar with marketing history and have a sound knowledge of success and failures of many types of marketing schemes. He must know a good deal about the principles and practice of Market Research, for on properly constituted research

he relies for a perfect knowledge of his market. Can it still be disputed that the man who has acquired proficiency in all these directions is worthy of membership of a profession—and a highly specialized profession at that?

Though Mr. Weston frankly admitted that he did not know much of the Gas Industry, he nevertheless viewed it through the eyes of a member of the sales profession and found it of absorbing interest. In the B.C.G.A. Mr. Weston personally placed great hopes, for it seemed to him to be the beginning of the raising of sales standards. Here indeed is a testimony to the Industry—that one of our National Bodies should be regarded in so important a light by one outside the Industry itself. In the Gas Industry Mr. Weston recognized a great industry which appreciates the importance of sales energy perhaps more than any other industry in the country. All over the country gas undertakings are pooling their sales knowledge and sales experience in one live central association. The B.C.G.A. can receive the experience of all, sift the good, take note of the reason for failure, and retail all this sifted knowledge to the executive units. Unencumbered by routine duty, it can study sales problems; it can put up creative ideas; and it can train salesmen and executives for the good of all. As a consumer of gas, said Mr. Weston, attempts have been made to make him gas conscious; as a consumer of electricity he merely pays the bill. One day, perhaps, he thinks our competitor may start developing sales energy; then the battle will be fiercer. But we have gained a long start; let us keep it.

Personal

Presentation to Mr. Albert Stokes.

On March 24 Mr. ALBERT STOKES, having reached the age of sixty-five, retired from the post of Gas Supply and Stores Manager to the South Metropolitan Gas Company. At the close of the Board meeting on the previous Wednesday, we learn from the Company's *Copartnership Journal*, Dr. Charles Carpenter, the President, on behalf of the Company, presented to him an antique silver tea tray, suitably inscribed, in appreciation of his long and distinguished service. The tray is the work of two eighteenth century London silversmiths, Robert Jones and John Scofield, whose craftsmanship is represented in collections of plate throughout the country. The inscription ran: "Presented to Albert Stokes, Esq., by the South Metropolitan Gas Company upon his retirement after 45 years' devoted service. 20th March, 1935."

The President, in handing the memento to Mr. Stokes, expressed the pleasure with which all saw the evidence of his recovery in health, and recalled the part which he had had in the establishment and development of a gas sales department. In returning thanks to the President and the Directors, Mr. Stokes remarked that in the days before a selling organization was introduced officials felt that their authority was often better displayed in cutting off a supply than in connecting it. Throughout his career in the Company he had had nothing but the most loyal and friendly assistance from all with whom he had been associated.

* * *

Mr. G. M. GILL, M.I.Mech.E., M.Inst.Gas E., has left his Victoria Street address and has taken offices at 52, Coleman Street, E.C. 2 (Telephone: Metropolitan 3622).

* * *

To fill the vacancy created by the death of Mr. John E. Kidd who had been a Director for many years, Mr. FRANCIS W. SWAINE COPE has been co-opted on the Board of the Alliance and Dublin Consumers' Gas Company.

* * *

A well deserved honour has been conferred on Mr. G. STEVENSON, Engineer, Secretary, and Manager of the Long Eaton Gas Company, for he has been appointed to the Commission of the Peace for Derbyshire.

A prominent Freemason, he is also a founder member of the Long Eaton Rotary Club, entering into Presidency during the second year of its career.

Mr. Stevenson's work on the Long Eaton Council (from which body he retired last year) has stamped him as a wise administrator and far-seeing adviser. He was first elected to the Council in 1905, and during his service passed through the chair of almost every committee and was Chairman of the Council in 1924-25.

The wonderful progress of the Long Eaton Gas Company has been due in a large measure to his foresight and business acumen, and stands as a unique recommendation of his thoroughness.

* * *

Mr. THOMAS OWENS, Superintendent at the Belfast Gas-Works, has retired after 53 years' service. Referring at a meeting of the Gas Committee to his resignation, Mr. R. J. Groves, Deputy-Chairman, spoke in glowing terms of the highly satisfactory manner in which Mr. Owens had carried out his duties during his long service and expressed the hope that he would be long spared to enjoy his well-earned rest.

* * *

On resigning the chairmanship of the Rhondda Golf Club which he has held for twenty years, many deserved tributes were paid to Mr. OCTAVIUS THOMAS at the supper-dance held at the club-house on April 4. He has been made a life member of the club and a presentation is shortly to be made to him. Mr. Thomas is the Hon. Secretary of the Wales and Monmouthshire Association and was formerly Engineer and Manager of the Rhondda Gas and Water Works.

Obituary

We regret to announce the sudden death on March 26 of Mr. ALFRED GEORGE COPP, J.P., Chairman of the Watchet and Williton Gas Light and Coke Company, Ltd., who was associated with other gas and water undertakings in the West of England. Mr. Copp completed his annual Address to the shareholders of the Watchet Company only a few minutes before he died, and it was read by another Director at the Annual Meeting held on the following Thursday. He was an elder brother of Mr. Harold E. Copp, M.Inst.C.E.

* * *

It is with regret that we report the sudden death on April 3 of Mr. WALTER HENRY COLEMAN, Chief Chemist to the National Benzole Company, Ltd., from 1923 to 1930 and subsequently their Consultant Chemist up to his retirement in December, 1934. Mr. Coleman had a very wide experience in the tar and chemical industries and was a member of many technical institutions.

* * *

The death has occurred of Mr. THOMAS COCHRANE, Secretary and Joint Managing Director of the Gas Purification and Chemical Company, Ltd. Mr. Cochrane had been in the service of the Company since 1874, and held the office of Secretary and Joint Managing Director for the last 28 years.

Correspondence

"Sales and C.V."

SIR,—I appreciate and thank you for the favourable comments under the above heading made by you in the Editorial Notes of your issue of March 27 on the Presidential Address which I recently had the pleasure of giving before the Manchester District Association of Gas Engineers. I similarly appreciate your divergent views and note that you raise certain points, as to one of which you would like to have a reply.

Regarding your inquiry inviting an explanation as to why the Spenborough Gas Department supplies gas of 460 B.Th.U. C.V. against a Declared C.V. of 450 B.Th.U. as so doing seems to you to be "unwarranted generosity" and "non-revenue producing," &c., you will note I stated in the Address that the Cleckheaton Gas-Works is unique in that it has but one gasholder there. In some years all, and in other years nearly all, of the gas made is produced at the Cleckheaton Gas-Works and they always work "in" and "out" of the one holder at the same time. This is not such good practice as working "into" one holder and "out" of another, and as it is not possible for the C.V. of the "make" to be kept so regular in a works the size of Cleckheaton as obtains in large gas-works it seems to me owing to these two factors, to be good practice to have a margin of 10 B.Th.U. above the Declared Quality. The Manager who has no anxieties as to the visits of the Gas Examiner sleeps comfortably every night, particularly so when he is entirely disinterested as to whether the Gas Examiner were installed permanently at the Gas-Works

whether he is coming or has been, or whether he never comes at all.

As a matter of fact our quality supplied is always very close to 460 B.Th.U., it must be kept so owing to the delicate wire tempering processes for which the gas is used in many works in our area, and it never reaches the Declared C.V. of 450 B.Th.U.

I agree that giving this 2·2% of better quality gas is non-revenue producing, but as this is a Municipal Undertaking, run to make neither a profit nor a loss, there appears little difference between giving the extra quality or alternatively reducing the price 2·2%. If it were a Company it would be otherwise, as the sale price of gas governs the rate of interest allowed. Furthermore is it not good business policy to supply to a purchaser a commodity having a consistently better quality than that for which he is paying or to which he is entitled? Most people are gratified at getting a little more of anything than they are entitled to receive, and it is well to foster this feeling, particularly as most people go through life saying they never get as much as they are worth.

You state that you do not "think there is any pyschological merit in the plan, for the consumer cannot appreciate that he is getting more than he is paying for." As to this, all consumers probably do not do so, but they are made aware of it when we are selling gas and appliances, and we do not find that it destroys confidence in our statements as to the performance of either.

Regarding your references to the views expressed by me as to the desirability of simplifying the Education Scheme Regulations, in which you state that you cannot think it is now very difficult to follow—that "a simple explanation of the Scheme was given by Mr. John Terrace at the Annual Meeting of the B.C.G.A. last September and published in the 'JOURNAL' for Oct. 3, 1934"—and you finish by stating "we suggest that busy gas engineers should refer to that statement."

I think you rather miss the point, but possibly I am wrong. The statement of Mr. John Terrace was most helpful, but as students and gas engineers will not in years to come always have close at hand your excellent "JOURNAL," particularly that of Oct. 3, 1934, to elucidate matters would it not be better instead to make it lucid in the Brochure on the Education Scheme issued by the Institution, as that is the very purpose of its being. If it cannot be made lucid therein without simplifying the scheme, all the better.

Yours, &c.,
A. L. JENNINGS.

Gas-Works, Cleckheaton,
April 5, 1935.

News in Brief

The Quarter's Index covering the January-March issues of the "JOURNAL" (Vol. 209) is published with this number.

An Increase of 14·8% in the output of gas for the year ended March 31 last is recorded by the Chesterfield Corporation Gas Department.

A Gold Medal was awarded to the Gas Light and Coke Company for their stand at the recent Modern Homes Exhibition held at the East Ham Town Hall.

An Application for a Loan of £4,975 for the relaying of mains by the Bangor (Co. Down) Gas Department was the subject of a recent Government inquiry in that town.

This Month's Issue of the "GAS SALESMAN" will be published on Saturday, April 27, in view of the fact that the usual publication date (the third Saturday in the month) coincides with the Easter holiday.

Applications are Invited for the position of Gas Engineer and Manager to the Borough of Abergavenny. The make of gas is 65 million c.ft., and the post carries a salary of £360 per annum rising to a maximum of £450.

The Work on the New Gasholder at Middlesbrough is steadily progressing and the first section of the tank will be lowered to its concrete foundations in the near future. The capacity of the new holder is to be 4 million c.ft.—equal to a day's consumption.

The Annual Exhibition of the Rhyl Gas Department was held at the Town Hall last week. The display consisted of an assorted arrangement of gas cooking, washing, and heating machines, in addition to portable and panel fires and complete hotel equipment.

Blackburn Commission Scheme.—The scheme of Blackburn Corporation Gas Committee for the payment of commission to members of their staff whose efforts result in the sale of gas appliances is to be continued for a further experimental period of twelve months.

Belfast Loan Sanctioned.—The Northern Ireland Ministry of Home Affairs has sanctioned the application of the Gas Committee of Belfast Corporation for the raising of a loan of £100,000 to meet anticipated capital expenditure on the development of the Gas Undertaking.

The Joint Reading of Gas and Electricity Meters is to be the subject of a conference between the departmental heads of the Blackburn Corporation Gas and Electricity Committee. The transfer of rentals kept by these departments to the Borough Treasurer is also to be discussed.

A Conference of Gas Managers and Engineers is to be called by the Board of Trade in connection with the proposed West of Scotland Gas Grid. If they approve of the scheme it will then be submitted to the local authorities and gas undertakings. Legislation would be necessary before the scheme could become operative, but it would be possible to make a start with the scheme by midsummer.

An Exhibition of Gas Appliances was held in Prestwick Town Hall from March 29 to April 5 by the Newton-on-Ayr Gas Company. Ex-Provost Gould, Ayr, presided at the opening ceremony, which was performed by Provost Marr, who said the Newton-on-Ayr Gas Company had served the district for 90 years. Among the exhibits were Ascot water heaters, Newbridge gas switches, and a good display of Main cookers.

Investors' Gas and Electric Trust announces that a half-yearly distribution amounting to 2·8575d. net on each sub-unit of the Trust will be paid. This is the second half-yearly distribution to be made by this Trust, and with the distribution of 3·051d. per sub-unit made on Nov. 1, 1934, brings the total distribution for the year to 5·9085d. net per sub-unit, equivalent at a price of 15s. per sub-unit to a gross annual yield of £4 4s. 9d.%.

A Scheme for Popularizing Gas Switches has been successfully inaugurated by the Croydon Gas Company. Under this scheme, Newbridge gas switches are supplied and fixed at a charge of 1d. per week for 100 weeks, thus making it financially possible for every gas lighting consumer to have the convenience of switching on the gas light. An immediate demand for switches resulted, which exceeded all anticipations and is being steadily maintained.

An Interesting Lecture on Instantaneous Water Heaters was delivered on April 4 by Mr. R. K. Adams, Superintendent of the Water Heater Section of the Parkinson Stove Company, Ltd., to the Sales, Fitting, and Maintenance Staff of the British Gas Light Company, Hull; a number of officials of the East Hull Gas Department also attended. Mr. A. W. Bonsey, Distribution and Fittings Superintendent of the British Gas Light Company at Hull, proposed a vote of thanks to Mr. Adams.

To Avoid the Heavy Import Duty imposed by the Irish Free State Government on brass gas fittings, the Alliance and Dublin Consumers' Gas Company are now manufacturing these articles in their own Works, a special section having been set apart for the purpose. There has been a remarkable advance in the gas sales in Dublin within the past year following upon the intensive housing programme being pushed on by the Dublin Corporation in pursuance of their slum clearance schemes.

On a Housing Estate consisting of 52 houses which are to be erected by the Ryton-on-Tyne Urban District Council, the Electric Supply Company were very anxious to get electricity installed, making a special point of the electric wash copper, which they stated could be run for 1½d. per hour with current at 1d. per unit. The Newcastle-upon-Tyne and Gateshead Gas Company, however, purchased an electric wash copper, and, having tested it for consumption and efficiency, they were able to satisfy the Committee that gas at the prepayment rate in that district was cheaper for washing clothes than electricity at 1d. per unit. They also furnished comparative figures for lighting with the result that they were successful in securing this load in addition.

An Assistant Distribution Superintendent is required by the North Middlesex Gas Company. Applicants, who must be between the ages of 25 and 35, must be fully experienced in Gas Fitting and Gas Supply, &c. The post carries a commencing salary of £300 per annum.

Considerable Attention was Attracted by the Glasgow Corporation gas showrooms in Sauchiehall Street on April 6 when the International Association Football Match was played between England and Scotland. In the front window was a bath brimming with water supplied hot from a gas heater, with a footballer standing by ready for his bath after the game. A title board stated "After the Match, the Bath," and an announcement read to the effect that the type of heater displayed was in use at Hampden Park where the international was played.

Cake-Baking Competitions contributed very largely to the success of the exhibitions which were held in Shanklin and Ventnor during the last two weeks in March, and which resulted in excellent attendances and increased sales of cookers. Mr. Leslie J. Payne, Engineer, Manager, and Secretary of the Shanklin and Ventnor Gas Company, organized the arrangements with characteristic thoroughness, and was assisted by Messrs. John Wright & Co., Birmingham (Radiation Limited). Cookery demonstrations were given by Miss E. J. Lindford, of Radiation Research Kitchen, during the course of the exhibitions, and an attractive new cooker sales scheme was introduced to consumers by Mr. Payne.

Public-Spirited Co-Operation is being invited by the Manchester, Salford, and District Branch of the National Smoke Abatement Society in their new campaign to combat the smoke nuisance. An official statement says: "More and more people are feeling that the time for a real effort in the matter is now, while so many new buildings, from the Central Library in the city to the new housing estates at Wythenshawe, buildings which should be a source of pride and satisfaction, are beginning to show evidence of dinginess due to smoke dirt. Little headway can be made without organized public co-operation. The real facts relating to the smoke nuisance and its damaging effect on our health and our public and private possessions, to say nothing of its destruction of that outward comeliness which should be one of the joys of city life, must be made known to every responsible man and woman."

Amalgamation and Grouping

South-Western Gas and Water Corporation, Ltd.

The South-Western Gas and Water Corporation, Ltd., announce that they have recently acquired a majority of the ordinary shares in the following gas undertakings: The Shaftesbury Gas and Coke Company, Ltd.; the Gillingham (Dorset) Gas and Coke Company, Ltd.; and the Castle Cary Gas and Coke Company, Ltd.

Wandsworth and District Gas Company.

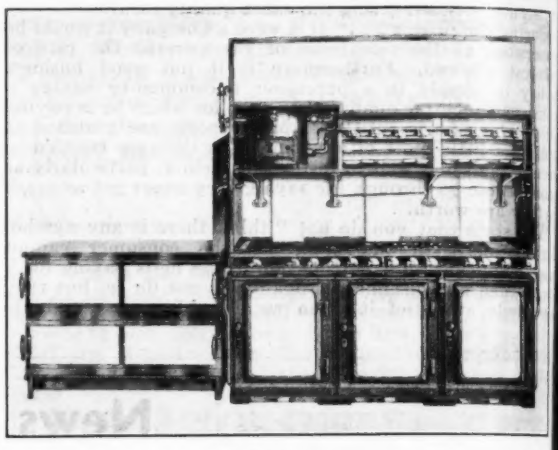
At the Extraordinary General Meeting of the Wandsworth and District Gas Company held on April 4 it was unanimously resolved to approve the provisional agreement and application to the Board of Trade for an order to put into effect the transfer of the Leatherhead Gas and Lighting Company to the Wandsworth and District Gas Company. The Leatherhead Company unanimously agreed the resolution at their meeting held on April 3.

Cooking at Sixty Miles an Hour

There must be few people who, enjoying a full-course lunch or dinner while travelling at 60 miles an hour on one of our many express trains, do not wonder how it is possible for a meal of such proportions to be cooked in the small limits of a railway coach.

As we take a seat in a crowded dining car, we must sometimes imagine a kitchen full of ovens, steamers, grillers, and boiling tables being essential to prepare meals for so many people, and consequently our illustration will doubtless interest most readers, for it shows a complete and composite gas-heated dining car range, one of many that have recently been supplied to the London Midland & Scottish Railway Company, by the well-known firm of Fletcher, Russell, & Co., Ltd., of Warrington. These ranges are for installation in some of the most famous trains now run by the L.M.S. Railway.

The range comprises three large ovens with hotplate on top, above which are two grillers, a hot water cylinder and cold water storage tanks. In front of these tanks is a large white enamelled panel which enhances the appearance of the range. On the left of the ovens is a gas-heated hot closet with sliding doors and a useful plain polished top. The range is therefore complete in itself and being compact renders it suitable for work in the very limited space of a railway coach. Moreover, the fact of it being gas-heated makes it suitable for quick working if necessary, and its construction is such that parts only can be used should there be few passengers requiring meals.



Fletcher Russell Railway Dining Car Equipment.

Appearance and cleanliness have been duly considered and all castings are finished in mottled porcelain enamel and all doors have white enamelled panels. Staybrite steel and chromium plating add further brightness and simplifies the task of cleaning. In addition to the range illustrated, orders for similar apparatus have recently been placed with Fletcher, Russell, & Co., Ltd., by the L.N.E. Railway and the G.W. Railway, and it is encouraging to realize that the largest railway companies in Great Britain still rely on gas as a means of cooking the meals prepared in their many trains.

Forthcoming Engagements

April.

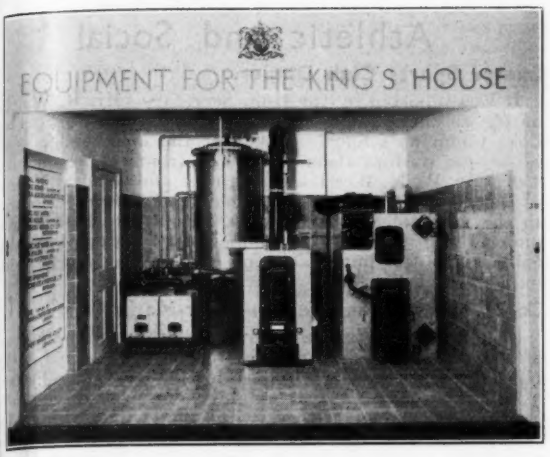
11.—S.B.G.I.—Council Meeting, 2.30 p.m.
12.—Southern Association (Western District).—Commercial Meeting, Rougemont Hotel, Exeter, 2.30 p.m.
13.—Midland Junior Association.—Visit to Coombe Wood Works of Stewarts & Lloyds, Ltd., and the Halesowen Gas-Works.
13.—Scottish Junior Association (Eastern District).—Visit to Kirkcaldy. Paper by Mr. J. M. Dow.
13.—Yorkshire Junior Association.—Meeting at Bradford. Paper by Dr. H. A. Fells.
26.—I.G.E.—Liquor Effluents and Ammonia Committee, 11 a.m.; Joint Research Committee, 2.30 p.m.
27.—I.G.E.—Examinations in Gas Engineering.
30.—Southern Association of Gas Engineers and Managers (Eastern District).—Meeting at 28 Grosvenor Gardens, S.W. 1, at 2.30 p.m.

May.

3.—North of England Association.—Annual Meeting at Newcastle-upon-Tyne. Paper by Mr. T. P. Ridley.
3.—Wales and Mon. Junior Gas Association.—Annual General Meeting at Cardiff, 6.45 p.m.
4.—I.G.E.—Examinations in Gas Supply.
15.—B.C.G.A.—Meeting of the Executive Committee, 11 a.m.; General Committee, 2.30 p.m.
15-16.—Eastern Counties Gas Managers' Association.—Spring Meeting at Stamford.
16.—B.C.G.A.—Yorkshire District Conference at York.
16.—Midland Association.—Spring Meeting at Hereford.
29.—B.C.G.A.—Midland District Conference at Worcester.

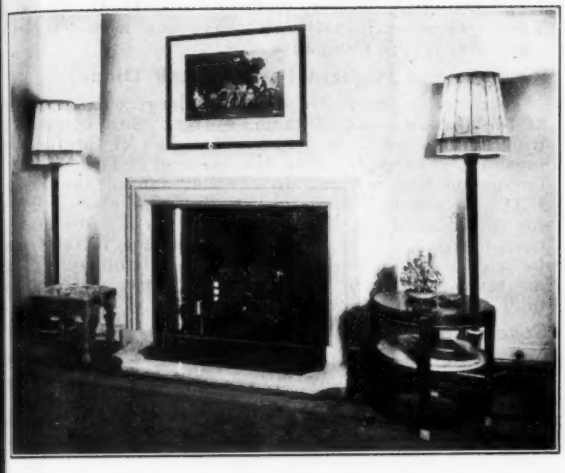
June.

4-7.—I.G.E.—Annual General Meeting in London.
25.—Southern Association.—Visit to Guildford.

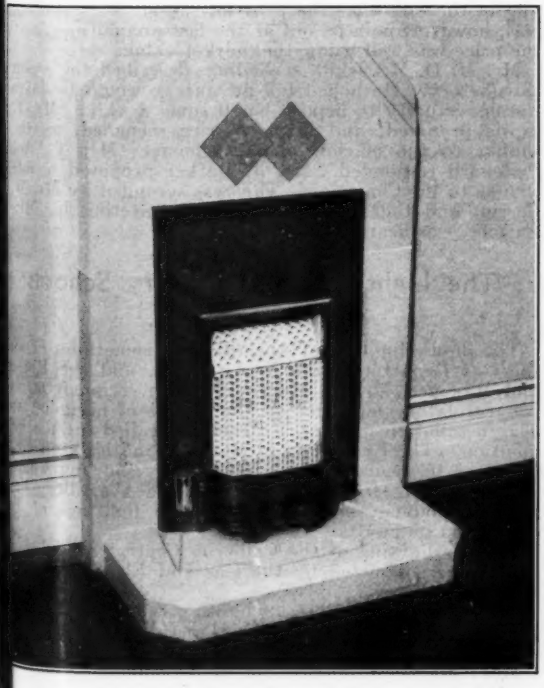


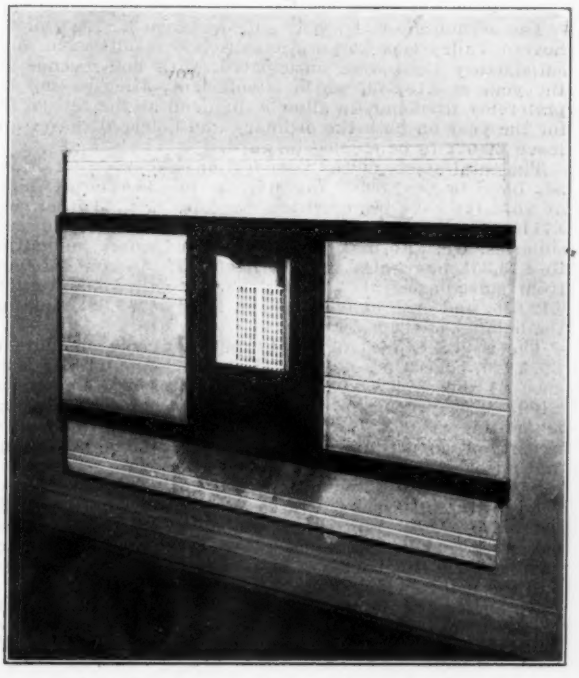
Gas and Coke Equipment for the King's House

We give on this page photographs and brief particulars of some of the gas and coke appliances installed in the King's House—a Jubilee Gift to His Majesty from the Royal Warrant Holders, and universally acclaimed as an outstanding example of the best and most up-to-date in planning and equipment.



The Gas Industry has a signal triumph to report in the gas and coke equipment for cooking, water heating, central heating, and largely for room-warming in the King's House, in which connection an illustrated brochure has been published by the B.C.G.A. No better story of the essential modernity of gas and gas coke could be devised, and it remains for the gas undertakings all over the country to broadcast the facts as widely as possible in order to increase the prestige of our products. The top photograph shows the boiler room equipment—"Ideal" gravity-feed coke boiler, with automatic control, for central heating, Beeston coke boiler for hot water supply, supplemented by Potterton "Emperor" gas-fired units, also automatically controlled, for summer use. Immediately above (left) is the Carron gas ignited coke fire in the drawing room; and (right) the beautifully laid out kitchen with Parkinson gas cooker. Below (left) is the Radiation "High Beam" gas fire installed in the maid's bedroom, and (right) an attractive Bratt Colbran "Portcullis" setting in another bedroom.





Gas and the Buxton Clinic

Buxton, with its healing waters and tonic air, has long been famous as a Spa for the treatment of rheumatism; it is to be even more so in the future, by reason of its latest developments.

A Company has recently been formed under the Chairmanship of Mr. W. T. Wrigley, F.C.A., a well-known philanthropist, to be known as the Buxton Clinic, Ltd.

A Display of the Cooking Equipment at the Buxton Clinic.

The Clinic occupies one-half of the famous Crescent, formerly the Crescent Hotel, and is to be equipped as a Residential Clinic with the most modern scientific apparatus for the treatment of rheumatic diseases. In collaboration with the Devonshire Royal Hospital, pathological and biological research will be carried out.

Gas has been adopted entirely for cooking and refrigeration purposes. The cooking equipment has been supplied by the Buxton Corporation Gas Department, and is of the latest type, in mottled enamel finish throughout. By permission of the Directors of the Clinic, the apparatus has been on view in the Gas Showrooms, where it has created a large amount of favourable comment from both residents and visitors.

Lord Horder of Ashford, K.C.V.O., M.D., F.R.C.P., Physician-in-Ordinary to the Prince of Wales and President of the Devonshire Royal Hospital, will open the Clinic on Friday, April 26, when His Grace the Duke of Devonshire will take the chair.

Severn Valley Gas Corporation

Successful Year

The accounts for the year ended March 31, 1935, of the Severn Valley Gas Corporation disclose results even more satisfactory than were anticipated, with net revenue for the year at £16,643, which is sufficient, after paying the preference dividend, to allow a dividend at the rate of 5% for the year on both the ordinary and deferred shares and leave £2,022 to be carried forward.

The total assets of the Corporation amounted on March 31, 1935, to £687,899. Investments in subsidiaries shown at £672,111 have been written down by £39,763 from cost, £711,875, which includes compensation to Directors of subsidiaries, &c. Formation and other expenses amounting to £13,351 have also been written off. Amounts owing from subsidiaries at £1,589, loans at call amounting to £12,816, and cash at bank and in hand at £1,381 make up the balance of the assets.

The issued capital of the Corporation now amounts to £672,720, consisting of £302,781 in 4½% cumulative preference £1 shares, £269,939 ordinary shares of £1 each and £100,000 deferred shares of £1 each. Share premiums amounting to £53,115 have been used for the purpose of writing off formation expenses, Directors' compensations, and purchase commissions referred to above.

Sundry creditors amount to £1,566, the preference dividend for the half-year to March 31, 1935, to £4,570, and the balance (£9,042) remains available for distribution. As has already been announced, the Directors have recommended final dividends for the year on both the ordinary and the deferred shares of 5% per annum, less tax.

An analysis of the Corporation's holdings, published with the accounts, shows that these holdings are spread over ten undertakings which supply the following towns and districts: Cheltenham, Gloucester, Stroud, Ludlow, Stourport, Iron Bridge, Tetbury, Brimscombe, and Chalford.

Athletic and Social

Exeter Sports Club Dinner.

It was reported by the Hon. Secretary (Mr. R. Whiting) at the recent Annual Dinner of the Exeter Gaslight and Coke Company's Sports Club that the membership of the Club since its formation had grown from 144 to more than 250. Mr. W. N. Westlake (Engineer and General Manager of the Company), who was present at the Dinner, referred to the value of a sports club of this nature to a business undertaking with a large number of young employees and emphasized the importance of competitive sports in the building of character.

Co-Partnership at Weston-super-Mare.

Long-service certificates were presented by the Chairman of the Weston-super-Mare and District Gas Company (Mr. H. Burt, J.P.) at the Annual Meeting of the Co-Partners of the Company to two employees who had completed twenty-five years' service with the Undertaking. The certificates bore the Company's seal, together with the signatures of the Chairman, the General Manager (Mr. J. Taylor), and the Secretary (Mr. J. F. Marlow), the recipients being Messrs. B. Leslie and H. G. Thompson. Twenty-three such certificates have now been awarded to employees of this Company.

Rushden and Higham Ferrers Staff Dinner.

There was a large attendance at the recent Staff Dinner of the Rushden and Higham Ferrers Gas Company, at which Councillor J. Roe (Vice-Chairman of the Company) presided. In replying to the toast of "The Directors," Councillor Roe referred to the decision of the Rushden U.D.C. to spend £800 on an installation of electric lighting for the main street without the option of a discussion in open meeting. If he had been a free-lance in the Council, he said, he would have voted for a trial lamp to be put up as it would have been fairer to both gas and electricity undertakings.

Success of Chester's Co-partnership Scheme.

The Annual Meeting of the Chester United Gas Company Co-partnership Scheme was held at the Gas-Works on March 26.

Sir John Frost presided and was supported by Mr. Richard Farmer, Mr. L. M. Synge, Mr. H. Hopkinson, Secretary, and Mr. Noble, Engineer.

Proposing the adoption of the report and accounts, Sir John said the amount allocated to the Co-Partnership Fund, £1,487, and the number of co-partner employees (151) who shared in the bonus were both again record figures. The bonus was maintained at 6½% on wages and salaries. Withdrawals amounted to £623, of which almost £100 had been paid out to employees who had retired on pension.

During the year £410 of the Company's ordinary stock had been purchased from the trustees by co-partners. This was a much smaller figure than in previous years, possibly due to the fact that the price of the stock was £110. It was, however, pointed out at the last annual meeting that the price was well below the market value.

Mr. M. D. McCaskill, seconding, described the report as satisfactory. He hoped full advantage would be taken of the opportunity to deposit small sums weekly. Mr. T. Lewis proposed, and Mr. A. Price seconded, a vote of thanks to the officials of the scheme. Mr. T. Walter Pritchard responded. Mr. J. Barker proposed a vote of thanks to the Chairman. This was seconded by Mr. W. Perrin, and the motion, put to the meeting by Mr. Farmer, was heartily carried.

The Lighting of Abertillery Schools.

Gas Wins on Merit.

The public lighting of Abertillery is something of which the Gas Department are justly proud, and the Engineer and Manager, Mr. H. Maycock, is the recipient of many congratulatory messages on the results of his good work. The installation in Church Street has called for particular mention. The Engineer and Manager and his staff are determined to secure the lighting load by showing what gas can do, and there is no doubt that the Abertillery Urban District Council selected gas for the lighting of the schools on its merits.

For the lighting of the Gellicrug Central School, quotations were submitted by the Gas and Electricity Departments as follows:

Electricity: Installing 76 lighting points and two power points £92 4s., or similar points installed in steel conduit £150.

Gas: Supplying and fixing 62 additional lights and special shades, £69.

Reason upon Reason— for installing W-D CONTINUOUS VERTICAL RETORTS

MODERN RETORT HOUSE DESIGN

GOOD WORKING CONDITIONS

HIGH WASTE HEAT RECOVERY

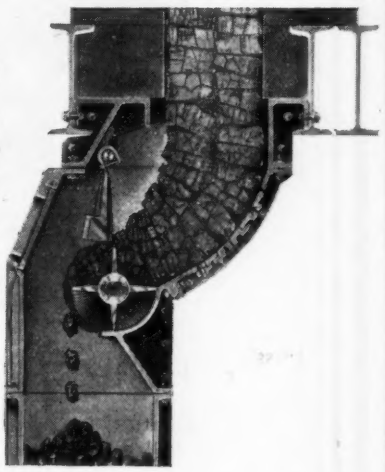
MAXIMUM FLEXIBILITY

EASY & ACCURATE CONTROL

HIGH THERMAL EFFICIENCY

LONG LIFE—LOW MAINTENANCE

IMPROVED COKE PRODUCTION



The logical design of the W-D Coke Extractor ensures even discharge of the coke without cutting or shearing it, and thus makes for the minimum breeze production.

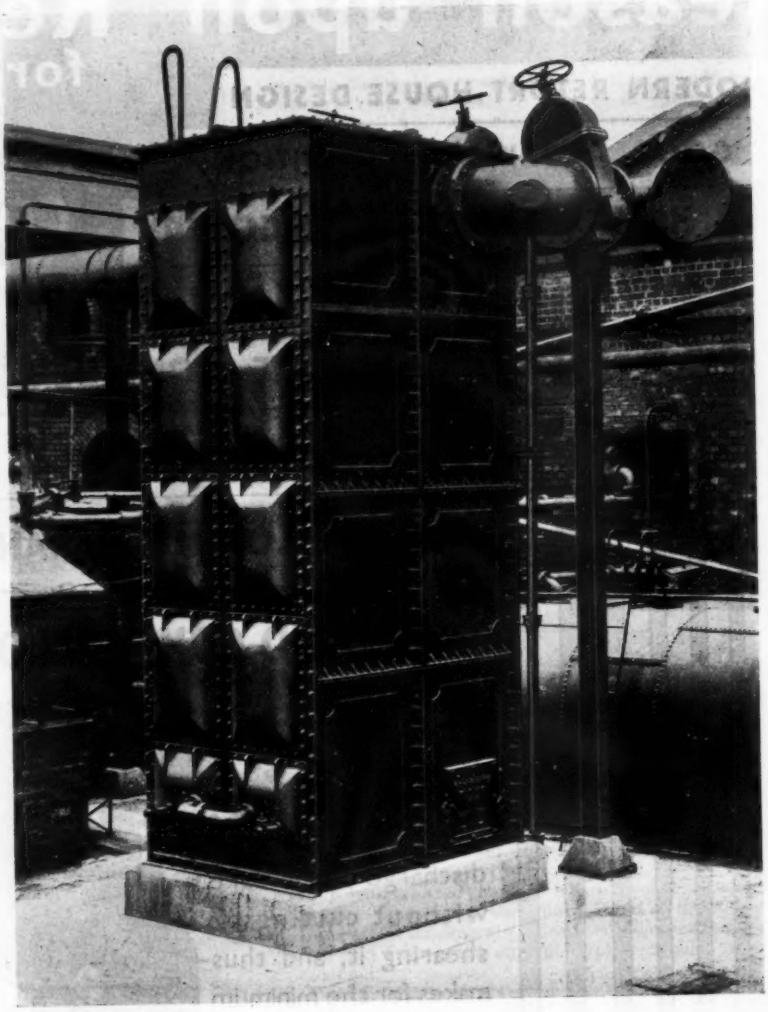
Coke is quenched within the bottom castings either by steam or by water according to the calorific value of the gas produced. Dry, cool coke of good appearance is the result.

The adaptation of the W-D Step-Grate Producer so as to burn the major portion of the breeze produced in the retorts enables a larger quantity of coke to be released for sale.

W-D

THE WOODALL-DUCKHAM VERTICAL RETORT AND OVEN CONSTRUCTION CO. (1920) LTD., EBURY & ALLINGTON HOUSES, 136-150 VICTORIA STREET, LONDON, S.W.1

MEMBERS OF THE SOCIETY OF BRITISH GAS INDUSTRIES



HORIZONTAL TUBE Water-cooled CONDENSER, capacity 2,000,000 cu. ft. of gas per day, erected at the KIDDERMINSTER GASWORKS.

ROBERT DEMPSTER & SONS, LTD.

Wire: "DEMPSTER" ELLAND **ELLAND** 'Phone: ELLAND 261

LONDON OFFICE: 16, Queen Anne's Gate, Westminster, S.W.1

Wire: "ELLANDORS, PARL, LONDON." Phone: Victoria 3661.

Basingstoke Trades Exhibition

The Gas Industry was well represented at the Basingstoke Trades Exhibition, for among those supporting Viscount Monck at the opening ceremony were Mr. H. C. Higgs, Managing Director and Secretary of the Basingstoke Gas Company, Mr. W. J. Bird, Chairman of the Basingstoke Gas Company, and Mrs. Eileen Murphy, Director of the Home Service Section of the British Commercial Gas Association.

One of the prize-winners in the British Commercial Gas Association's Kitchen Planning Competition was Mrs. Merrett, of Winchester Road, Basingstoke, and Mrs. Murphy was present to congratulate her and award her the prize she had won. In making the presentation, Mrs. Murphy stated that Mrs. Merrett was being given a good start with her kitchen because the Basingstoke Gas Company were very kindly presenting her with a gas cooker. The announcement was received with enthusiastic applause.

The Basingstoke Gas Company had a prominent central stall, on which was arranged an interesting display of modern gas cookers, coppers, and other household apparatus served by gas, while the illumination by the daylight mantles was very striking.

General Purpose Thermometers

The British Standards Institution has recently issued a British Standard Specification for Laboratory Thermometers for General Purposes. The British Standard series, which has been drafted as far as possible to fall into line with existing standards, may be divided into four classes as follows:

Series A, accurate thermometers with zeros, about 400 mm. long, covering ranges of about 30° C. (60° F.) and divided to 0·1° C. (0·2° F.).

Series B, similar to Series A but with ranges of about 60° C. (120° F.) and divided to 0·2° C. (0·5° F.).

Series C, thermometer for less accurate work, without zeros and about 200 or 250 mm. long, covering ranges of 100° C. (200° F.) and divided to 1° C. (2° F.). The thermometers in this series are intended for use when compactness is essential.

Series D, thermometers covering the complete scale from 0° C. (32° F.) up to their respective maximum temperatures, length 300 mm. and divided in a manner suited to this length for each range.

Many existing thermometer specifications will be found to be covered fairly closely by the corresponding details given for one or other of the thermometers included in the British Standard Specification, and a table showing an example of this correspondence is given in the Specification for the information of users.

For convenience of reference to individual thermometers a schedule mark has been allotted to each thermometer indicating (i) the series to which the thermometer belongs, (ii) the nominal maximum working temperature, (iii) the immersion at which the thermometer is intended to be used.

For example, "A/20C/Total" indicates a thermometer of Series A, having a nominal maximum working temperature of 20° C., and calibrated for use at total immersion. Similarly, "B/140F/100" indicates a thermometer of Series B having a nominal maximum working temperature of 140° F. and calibrated for use at 100 mm. immersion.

The dividing of the thermometers in these four series is, with one or two exceptions, such that they can be read to as high an accuracy as can be certified by the National Physical Laboratory in the temperature range concerned. The Specification provides that the spacing of the divisions shall not be less than about five times the width of the dividing lines. Closer subdivision of the scales would result in lower accuracy of observation unless the Specification called for exceptionally fine lines, such as would be likely to be found inconvenient in the normal use of a "general purposes" thermometer.

In general, the thermometers are divided just above their nominal maximum temperatures in order to secure a suitable overlap between ranges.

In each series, thermometers graduated for total immersion, and theremiometers graduated for partial immersion are included for each thermometer range. The partial immersion thermometers of Series A, B, and D, and certain of those in Series C, are graduated for 100 mm. immersion and are therefore suitable for use with the distillation flasks specified in the British Standard Specification for Distillation Flasks, No. 571.

Copies of this new B.S. Specification (No. 593-1935) may be obtained from the Publications Department, British Standards Institution, 28, Victoria Street, London, S.W. 1, price 2s. 2d. post free.

Gas Institute of New Zealand

The Annual Meeting of the Council of the Gas Institute of New Zealand was held on Feb. 6 at the office of the Christchurch Gas Company, Ltd., Moorhouse Avenue. Those present included the President, Mr. J. J. Hurley (Christchurch), Mr. F. W. J. Belton (Christchurch), Mr. H. C. Ridley (Christchurch), Mr. A. Morrie Taylor (Timaru), Vice-President and Secretary, Mr. J. Grenfell (Oamaru), and Mr. G. A. MacFarlane (Christchurch), Treasurer. Apologies for absence were received from the following members of the Council: Mr. James Lowe (Auckland), Mr. M. J. Kennedy (Wellington), Mr. Alex. Couper (Dunedin), and Mr. W. B. O'Toole (Invercargill).

After the Meeting the members of the Council, at the invitation of the President, were entertained at luncheon.

An Effective Link-Up

A Window Display arranged by the Burnley Gas Department in connection with a recent celebration of the Centenary of the Burnley Cricket Club. The display was supplied to the Department by Messrs. John Wright & Co., Ltd.

Bournemouth Gas and Water Company

Acquisition of Wimborne Minster Undertaking

Two Extraordinary General Meetings of Shareholders were held at the Offices of the Company on Friday, April 5, 1935—Mr. WILLIAM CASH, J.P., F.C.A. (Chairman of Directors), presiding.

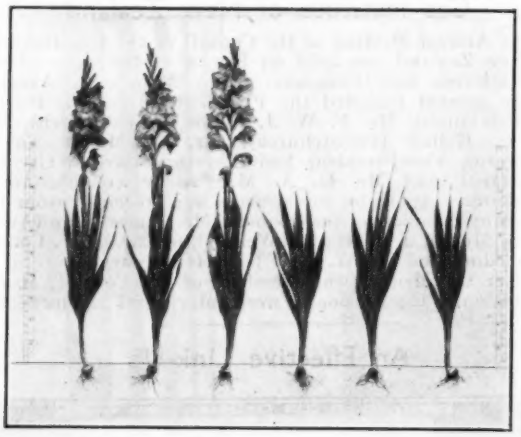
The first Meeting was convened to approve the agreement made between the Company and the Wimborne Minster Gas Company, Ltd., under which the Undertaking of that Company was to be transferred to the Bournemouth Company. The Chairman explained the agreement. The consideration payable, for the most part in stock of the Bournemouth Company, would give to the shareholders in the Wimborne Company an amount equivalent to their present dividend. The agreement also provided for compensation to the Directors and Auditors of the Wimborne Company. It was proposed to retain the Manager and the existing staff. He pointed out that the shareholders would obtain stock with better security, as the Bournemouth Company was both a gas and water undertaking. The transfer seemed particularly appropriate in view of the fact that the Bournemouth Company were already supplying water in Wimborne and had gas mains adjacent to the Wimborne Works. The Wimborne Company was a Company with a good record and well administered. The Bournemouth Company hoped to obtain increased consumption, not only in Wimborne, but also on the route of a new trunk main designed to bring the gas from Poole to Wimborne. Consumers would benefit, as the price of gas would be reduced immediately after the transfer from 9·2d. per therm to 8·6d. per therm, 0·4d. per therm above the present Bournemouth price. The Wimborne shareholders were being asked to approve the agreement within the next few days, and effect would be given to it by Bill.

The provisional Agreement of March 15, 1935, was unanimously approved on the motion of the CHAIRMAN, seconded by Sir CHARLES L. MORGAN (Deputy Chairman).

At the subsequent Meeting the Bill now before Parliament, providing for the transfer of the Undertaking of the Wimborne Minster Gas Company, was also approved, subject to such alterations as may be made in the Bill by Parliament approved of by the Directors.

The Chairman explained that the Company were taking steps to get the Bill introduced as a late Bill in the present Session, and the Bill also contained provisions for rectifying a mistake in the 1934 Order of the Board of Trade as to boundaries and further extending the boundaries of the present Wimborne Company to some small extent following the intention of the Wimborne Company so to do.

On the CHAIRMAN'S motion, seconded by Sir CHARLES L. MORGAN, the Bill was unanimously approved.



These gladioli were all planted at the same time, but those on the left were grown in warmed soil.

Soil Warming by Coke Boilers

Our contributor suggests that the technique of soil warming, which should not be confused with soil heating, has a great future, and that coke is an excellent fuel for the purpose.

In recent years much experiment and research have been devoted to soil warming as a means of creating the most efficient temperature conditions in the soil for growing plants of many varieties. These conditions have now been definitely established, and it has been proved in practice that the idea is economically sound.

Soil warming should not be confused with soil heating, as comparatively low temperatures are employed. For instance, in one case an enthusiastic nurseryman used steam as the heating medium, with the result that the temperature was too high, and his crops suffered in consequence. The following table gives some idea of the advantages to be gained from soil warming a crop of tomato plants:

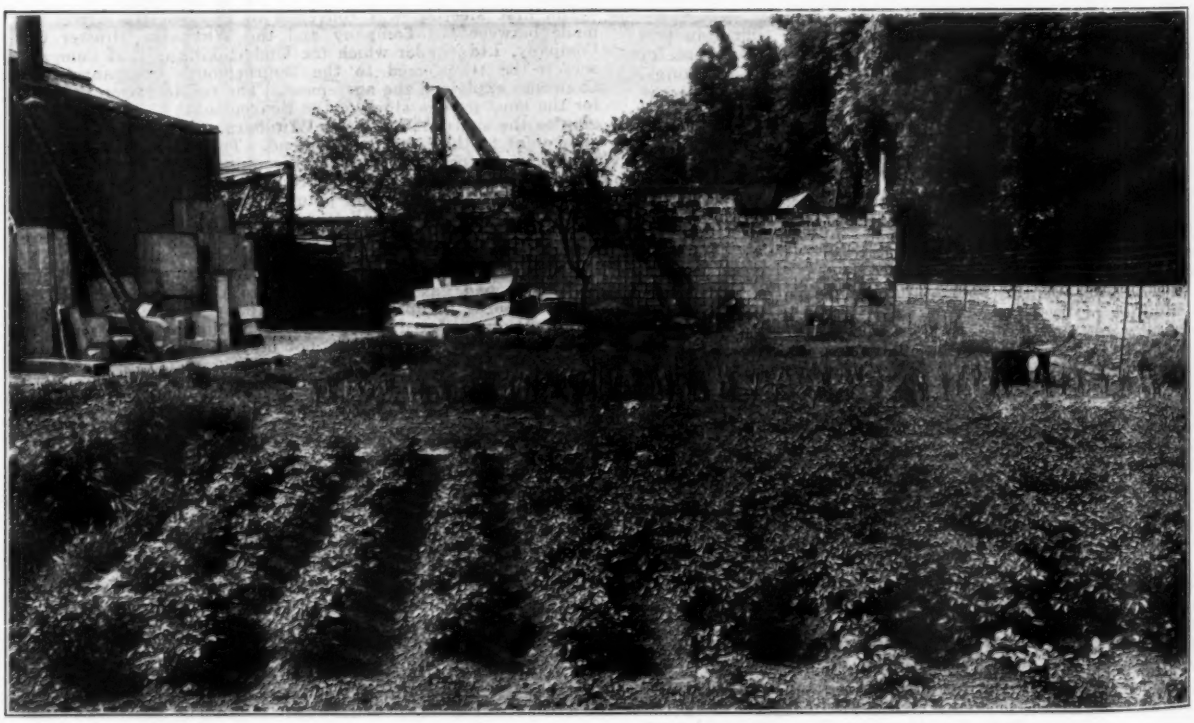
Plot No.	Temperature. °F.	Yield of Tomatoes in Pounds per Plant.				
		May.	June.	July.	At the End of July.	At the End of the Year.
3	62 (not warmed).	0·02	1·20	1·96	3·18	44·32
4	84 (warmed) . .	0·14	2·15	2·14	4·43	52·13
5	78 ,, . .	0·08	2·46	2·01	4·55	53·80
6	62 (not warmed).	0·08	2·03	1·53	3·64	42·71

These results show that crop increases of 23·6% and 19·1% respectively had been obtained from the warmed plots for the whole season. Up to the end of July the increases were 33·4% and 30% respectively. These figures have been extracted from the 17th Annual Report of the Experimental and Research Station, Cheshunt, where Dr. Bewley has done the pioneer work on soil warming in this country.

Soil warming, therefore, increases crop yield and brings the crop on earlier in the season, a feature of vital importance to nurserymen. Moreover, the quality of the crop is not depreciated in any way. In this country attention has been mainly devoted to the culture of tomatoes and cucumbers by this method. For tomatoes a crop increase of 30% can confidently be expected, and this increased output in the earlier months is of great value to the nurseryman; the market value of the crop may thus be increased by more than 30%.

This method of culture has given successful results for many different crops, such as melons, lettuces, radishes, mushrooms, early potatoes, and flowers, shrubs, bulbs, and cuttings. In the case of cucumbers the increase in crop yield has been, on an average, ten tons per acre.

A further application is the preservation of plants and cuttings during the winter, when the plants are kept in warmed soil and light is excluded. This prevents further



A crop of potatoes, showing those grown in unwarmed soil on the left and in warmed soil on the right. An automatic temperature controller can be seen in the right background.

growth, but the warmth keeps the plants alive. This method is ideal for keeping cuttings and seedlings ready for planting at the appropriate season.

Perhaps the most important application, however, is in the production of seasonal plants for any early market. This is carried out extensively in Holland in the bulb fields, and in England tulips and hyacinths are produced in time for the Christmas trade, fetching high prices. Generally speaking, crops grown in warmed soil are remarkably immune from plant diseases.

In the early development of this technique electricity was used for experimental purposes, being easy to control and measure. In practice, however, it cannot compete with solid fuels.

The use of coke is now being advocated, and an installation is already in operation. This is installed at the Hertfordshire Institute of Agriculture, near St. Albans, and is divided into two sections. One section consists of six rows of Dutch lights, each 50 ft. long by 4 ft. wide; the other section is an open bed measuring approximately 60 ft. by 50 ft. A coke-fired magazine type boiler is employed, being automaticaly controlled by a thermostat placed in the warmed soil. The apparatus requires attention only once a day, the heating medium being hot water.

The pipes are laid at a depth of between 15 and 18 in. below ground level, this depth being sufficient to avoid damage due to digging. They are set in pairs under each row of Dutch lights, being spaced at 2 ft. centres; the spacing is similar under the open bed. Water circulation is by gravity, and careful arrangements are made in order to prevent air locks forming in the pipe system, by means of a method evolved by the London and Counties Coke Association.

In England the majority of soil warming plants have been installed under glass, but experts believe that there remains a wide field of application for its use under open beds, or beds which are temporarily protected should conditions become severe. One of the accompanying photographs gives some idea of what has already been accomplished in the cultivation of gladioli. A sample of some lettuces, for instance, taken from a heated bed in the open gives a weight of 7½ ozs., as compared with 1¼ ozs. from the unheated bed. These samples were weighed after seven weeks' growth.

The cost of a complete installation to cover an acre would be less than one-eighth of that necessary for corresponding glass houses, and the return on capital expenditure should be excellent. The installation cost would vary according to the site, but it is estimated that a coke burning plant should not cost more than £600 per acre. The running cost would obviously be dependent upon weather and rainfall conditions, but it has been conclusively proved that it is but a fraction of that involved in the operation of glass houses over a similar area.

The Author is grateful to the London and Counties Coke Association for the foregoing information, and to Messrs. Richard Crittall & Co., Ltd., for permission to publish the accompanying photographs.

Gas, Coke, and By-Product-Making Properties of American Coals and Their Determination*

As a result of the co-operation of the United States Bureau of Mines and the American Gas Association, a standard apparatus has been developed for determining the yields and characteristics of the products obtained by the carbonization of American coals. Up to the present, some thirty different gas and coking coals have been examined and the survey is being extended to further coals.

The apparatus, which was finally adopted after a preliminary investigation, may be regarded as intermediate between the large scale test plant and the laboratory assay apparatus. Two sizes of test retort may be used—*i.e.*, 13 in. or 18 in. diameter, holding about 100 lbs. and 180 lbs. of coal respectively. The small size is of more general utility, although the larger retort gives results which approximate rather more closely to those obtained on commercial plants. The retort is comprised of a drum of ⅛ in. sheet steel and is serviceable for two tests. The drum, after filling with coal, is inserted into a gas or electric furnace and the volatile products are taken to the usual condensing and purifying apparatus. It may be noted that the tar is removed by a Cottrell electrostatic precipitator. The temperatures of the retort wall and of the centre of the charge are determined by means of a number of thermo-couples embedded in the coal and heating is continued until the coal has reached the same temperature as the wall. In carrying out the test the furnace is heated to the required temperature before the retort is inserted, so that the retort wall attains the carbonizing temperature almost immediately. The carbonization may be carried out at any temperature from 500° to 1,000° C., and a series of tests has been made on each coal at intervals of 100° C.

Several advantages are claimed in respect of the above apparatus as compared with laboratory assay methods. The quantity of coke, tar, gas, &c., obtained is sufficient to allow of a detailed examination of these products, and their characteristics are found to approach more closely to those obtained from commercial plants. Detailed comparisons are given between the results obtained from the above test—which is known as the BM-AGA test—and the yields of gas, tar, &c., obtained from the same coals on the large scale. The latter results are in fair agreement with those obtained in the test apparatus if the test is carried out at a temperature of 900° to 1,000° C. The higher temperature is necessary to secure agreement in the case of the tar yields, which tend to be comparatively low from the commercial plants. On the other hand, a higher gaseous thermal yield is obtained from the large scale plants. In view of the difficulty of obtaining the same cracking conditions in the test retort as on the large scale, these differences are to be anticipated, and it is well known that this constitutes one of the greatest difficulties in reproducing plant results in the laboratory. Further, it is necessary to vary the cracking conditions in the test according to the type of large scale plant in use, and hence there can be no standard procedure in this respect. A further factor is the formation of water gas and producer gas by the decomposition of waste gases and steam, and for this reason test yields are often substantially lower than those obtained on commercial plants.

The coke from the test retort is lighter and more porous and has a lower shatter index than the coke from the commercial plant, which is again to be anticipated owing to the small charge and relatively high rate of heating. Comparative tests are made between the BM-AGA method and various laboratory assay methods. Among these is included the Fuel Research Board Assay. It will be recalled that in this latter test provision is made for cracking the volatile products, and a gaseous thermal yield similar to that obtained in horizontal retorts can be secured. With a number of coals the two tests show appreciable differences—*e.g.*, the gas yield differs in the case of Fuel Research test by + 1,400 to − 700 c.ft. per ton. Differences of a similar order are found with the tar yields. It was found by the Fuel Research Board investigators that the difference between the assay and large scale results varied with coals of different coking power, &c., and the above comparison tends to a similar conclusion.

As a general guide to the gas and coke making properties of any coal the results of the American test are most valuable, and a survey of British coals might well be carried out in a similar manner. The size of the apparatus and the work involved in the execution of a test limit its use to large undertakings which, in most cases, prefer to carry out large scale tests. Having once correlated the results with those of any particular commercial plant an apparatus of the BM-AGA type should, however, prove very valuable, and it is noted that it is being used by several American companies.

Apart from the yields of products, &c., several points of interest are found in the details of the tests which have been carried out—for example, the time required for carbonization varies according to the temperature as expressed by the following equation:

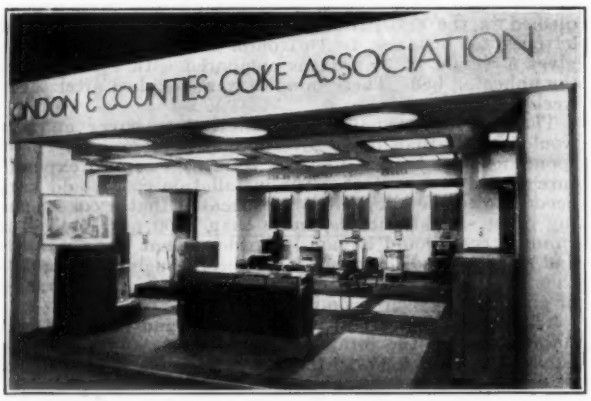
$$\text{Time (hours)} = 0{\cdot}216 \times 10^{\left(\frac{1\,777}{T}\right)}$$

where T is the absolute temperature in degs. C.

A comparison is made between the time required for car-

* "Gas, Coke, and By-Product Making Properties of American Coals and their Determination," by A. C. Fieldner and J. D. Davis, XII., 64, United States Department of the Interior (Bureau of Mines), Monograph 5, printed by the American Gas Association, New York.

bonization at a given temperature and the rank of the coal, and shows that there is a rough correlation between the time and the percentage of fixed carbon in the ash and moisture-free coal. The " rational " analysis—that is, the proportion of bitumen compounds, ulmins, &c.—of a number of coals was carried out, and these figures are compared with carbonization yields. The results obtained " provided no data for predicting the behaviour of coals on carbonization that could not be obtained more easily and with more assurance from the ordinary proximate and ultimate analyses." In regard to the various tests for agglutinating power, plastic range, &c., it is stated that their correlation with the carbonizing results has shown them to be of little practical value.



London and Counties Coke Association Stand.

Further Views

OF THE

Ideal Home Exhibition

The accompanying photographs give some further views of various displays at the *Daily Mail* Ideal Home Exhibition at Olympia, a full illustrated account of the gas exhibits at which was given in last week's issue of the " JOURNAL."

Two Views of the London Gas Exhibit Committee's Display.

A Voluntary Effort

Stories have been told from time immemorial of the slips made by Mrs. Newlywed in her shopping expeditions. No doubt many of them have been gross exaggerations, but, even so, in her trials and tribulations she may have been the recipient sometimes of less sympathy than was her due. And every day, with the coining of fresh words, the display of unfamiliar designs, and the creation of new materials, the basis of this sympathy tends to become widened. It must, in fact, be obvious, even to the mere man (who never has been regarded as an expert shopper), that one does not invariably receive plain goods in response to plain requests. This may make matters difficult enough for shoppers, but its implications may be equally, if not more, serious for traders.

Hence there can be nothing but good wishes for the success of a movement which has just been inaugurated to expunge uncertainty from the mind of the shopper. It is a voluntary effort, and so will need general goodwill, but there is no reason to suppose that this will not be forthcoming, for the facts of the case are clear. It is recognized that the increasing complexity and variety of modern merchandize make it difficult for the average customer—or, indeed, the expert trade buyer—to distinguish between the rival merits of goods offered for sale, and that an accepted meaning for the language used in the descriptions intended to guide the purchaser has never been so important as to-day; and the Retail Trading Standards Association has been organized to tackle the problem. The Association will comprise shopkeepers pledged to abide by certain published rules for the guidance of customers, and the members will be entitled to display an arranged sign so long as they observe the standards laid down.

The list of trades which it is intended to cover does not include foodstuffs, but it embraces many branches of trade in which the allocation of definite meanings to descriptions of goods will be an advantage. Shops displaying the sign will thereby intimate, for example, that the words " sale price " really mean a reduction from the normal price; that merchandize displayed in the window is identical with that sold in the shop; that a piece of furniture described as antique is at least a hundred years old; and that the word " woollen " is applied only to material made of wool. It is stated that any shop which persistently and wilfully misleads a customer " may " be warned, or expelled from the Association, and the sign withdrawn. We should have preferred the use of the word " will," but it may doubtless be assumed that the Association are determined to take all possible steps to enforce their own rules.

The trouble is that, as already mentioned, the movement is a purely voluntary one. We should like to see the aims and objects for which the Retail Trading Standards Association has been formed embodied in the laws of the land. In the case of our own Industry, every consumer is fully aware of the minimum value of the commodity with which he is being supplied, and, though ofttimes the restrictions imposed by Parliament are irksome, there are unquestionable advantages in having, as it were, a " hall mark " of quality applied to the gas which is sent out.

A. H.

"Fast" AND "Slow"

by
J. H. BINGHAM, M.I.Mech.E.

Our contributor, who is General Manager of Metropolitan Gas Meters, Ltd., endeavours to deduce the causes of those errors in registration of dry gas meters known as "fast" and "slow."

"Fast" and "Slow" errors may be classified into two groups, viz.:

(1) Those errors found in a new meter or in any meter recently adjusted or calibrated. It is known that when a meter has been adjusted or set, as it is termed, to measure correctly at some predetermined output, the degree of accuracy decreases from some output below and some output above that at which the meter has been adjusted. The degree of accuracy is not constant for all rates of working, although the range of rates for which correctness is obtainable may be a reasonably lengthy one.

(2) "Fast" and "slow" errors which appear during the life and working of a meter. In other words, the departures from, or changes in, those degrees of accuracy of measurement which the original adjustments provided for.

It is proposed to deal only with the errors of the first group.

A gas meter depends for its ability to measure on the movement of two flexible diaphragms. The volume of gas displaced by the travel or movement of each diaphragm between its two extreme positions represents approximately one-quarter of the output of the meter per cycle of operation. In each cycle, each diaphragm makes two displacements, one during its outward travel, and one during its return stroke. The summation of the four displacements is, therefore, the capacity of the meter per revolution or cycle of operation.

It is considered advisable here to correct the misconception which has arisen from the description of a gas meter as being an instrument containing four measuring chambers. The mention of measuring chambers conveys the idea of the existence of vessels or compartments of predetermined and unvariable dimensions. It is the displacement of the flexible diaphragm itself which forms the basis of measurement, and the dimensions of the container in which the diaphragm moves bear no relation to the size of the diaphragm itself. So long as the diaphragm is unrestricted in its movement the size of the surrounding structure does not matter. To give a simple illustration of this it may be stated that if the diaphragms from a 5-light meter be mounted in the carcass of a 500-light meter, the capacity of the latter to measure, although of considerably greater external dimensions, would be no greater than that of the original 5-light meter, as the maximum diaphragm displacements obtainable in each case would be the same.

The output or measure of a meter is governed by its output per cycle of operation.

One revolution of the recording index of a gas meter represents a definite and invariable number of cycles of operation. It follows, therefore, that if at different rates of working, there are variations between the actual volumes of gas passed through the meter, and the apparent volumes as indicated by the recording mechanism, the extent or measure of the cycles of operation must vary. Again, the number of diaphragm strokes per cycle being fixed and constant, the extent of the individual strokes, or the measure of the individual displacements of the diaphragms, through some cause or other is made to vary. If this reasoning is accepted it is obvious that the fewer the number of displacements required to produce a certain output the less the liability to error. It is reasonable to assume also that the error per stroke is constant for particular speeds of working regardless of length of stroke. In other words, if a normal stroke of, say, 1 in. is capable of variation between a range of ± ⅛ in. with varying speeds, a normal stroke of 2 in. would have similar limits of variation with similar varying speeds.

The conclusion arrived at from the above is that large stroke and less speed make for the least error. This appears to condemn the present practice of reducing stroke and increasing speed as in the new small high-capacity series of meters.

Extent of "Fast" and "Slow."

In order to appreciate the extent of the variations in registration found in meters, a typical test report as set out below will be examined. The series of tests quoted are those made on a small high-capacity meter having a scheduled output of 100 c.ft. per hour, and a capacity of one-tenth of a cubic foot per revolution or cycle of operation.

Output per Hr. in C.Ft.	1	2	5	10	30	60	100	120
Test holder reading in c.ft.	1·98	1·98	1·99	2·00	2·00	2·00	2·00	2·00
Percentage error	1·01 F	1·01 F	0·50 F	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*

Output per Hr. in C.Ft.	140	160	180	200	220	240	260	300
Test holder reading in c.ft.	2·01	2·02	2·02	2·03	2·03	2·04	2·05	2·05
Percentage error	0·50 S	0·99 S	0·99 S	1·48 S	1·48 S	1·96 S	2·44 S	2·44 S

It is seen that when the meter is expected to pass gas at the low rate of 2 c.ft. per hour it is 1·01% fast. This percentage error is calculated by passing through the meter from a standard test holder sufficient gas to cause the pointer of the test circle of the recording index to turn through one complete revolution, and converting the difference between the apparent volume of gas passed and the actual as recorded on the test holder into a percentage of the actual volume. In the particular test under consideration the meter index recorded an apparent flow of 2 c.ft. whereas the test holder showed that only 1·98 c.ft. of gas had passed through the meter.

As previously explained one complete revolution of the test circle pointer on the recording index represents a definite number of cycles of operation, which number is arrived at by dividing the indicated value of one revolution of the test circle pointer by the supposed output per cycle of operation. The test circle value for this type of meter being 2 c.ft. and the cycle value 0·1 c.ft., the meter is required to make twenty cycles of operation in order to permit of the test circle pointer making one complete revolution. If, therefore, the meter when making twenty cycles of operation allows no more than 1·98 c.ft. of gas to pass through it, the average value of each cycle of operation instead of being 0·1 c.ft. is only 0·099 c.ft. That is to say, the displacement of the diaphragms is less than it is intended to be. It has been shown that a shortening of the stroke or travel of the diaphragms will cause a reduced displacement. By what amount has the stroke or travel been reduced in this case? Had the meter been constructed with solid pistons reciprocating in cylinders instead of with flexible leather diaphragms moving into and out of the metal rims to which they are secured at their peripheries, the diminution in stroke necessary to produce the decreased displacement could be ascertained easily. For purposes of calculation it is proposed to regard the diaphragms as solid pistons. The travel of the diaphragms in the meter tested is 1·75 in., or to be correct this is the extent of travel necessary to ensure a passage of 0·1 c.ft. of gas per cycle of operation. As the displacement has been reduced by 1% the travel of the diaphragms has been diminished by an equivalent fraction which is represented by so small an amount as 0·0175 in.

With increasing rate of output, brought about by increasing speed of working, it follows from an examination of the subsequent test results that the length of diaphragm stroke and displacement increase. When the meter is registering correctly the diaphragm displacement is correct and therefore the stroke or travel is normal.

The series of tests shows that the registration of the particular meter is correct for a certain range of rates of output and speeds of working, but nevertheless the general tendency is for the displacements to increase with the speed. When the meter is supposed to be passing gas at the rate of 2 c.ft. per hour the registration is 1·01% fast, whereas at the supposed rate of 300 c.ft. per hour it is

2·44% slow. This range of variation converted to a lineal stroke basis with $1\frac{3}{4}$ in. as the normal is from 1·7325 in. to 1·7938 in.

The Statutory Regulations state that a meter shall not be stamped which registers more than 2% over or 3% under the actual quantity passed.

Converted to a lineal stroke basis with $1\frac{3}{4}$ in. as the normal, this means that if the range of variation in stroke is outside the limits of 1·715 in. and 1·8025 in., the meter will not satisfy the requirements. It will be seen that the range of permissible stroke variation is less than one-tenth of an inch.

Having regard to the fact that the diaphragm is flexible and its supporting and controlling arrangement is not truly rigid, is it unreasonable to deduce that the comparatively small tolerance in lineal stroke can be exceeded as a result of the varying momentum brought about by variation in speed. If not then it must follow that the greater the speed range, or the greater the output range, the greater the tendency to measurement variation.

The Annual Meeting of Gas Salesmen

Representatives of the sales sides of 85 gas undertakings in all parts of the country attended the Annual Meeting of Gas Salesmen held under the auspices of the B.C.G.A. at the Caxton Hall, Westminster, last Friday. A brief report of the proceedings is given below, and a fuller account will be published in this month's "GAS SALESMAN."

In opening the proceedings, the PRESIDENT of the British Commercial Gas Association (Councillor W. Muter, Convener of the Edinburgh Corporation Gas Department) said that he had great pleasure, in the name of the Association, in extending to those present a warm welcome to this important Annual Meeting of Gas Salesmen, which presented an opportunity for them to renew acquaintance with their colleagues, and he hoped that they would return to their various areas fortified by fresh hopes for the future of their great Industry.

In many districts they were working against heavy odds, and the salesman could not be expected to get orders and deliver the goods unless he was supported by up-to-date commercial management. Remarkable progress had been made by undertakings in the display of their goods, and in this connection he referred to his visit the previous week to the opening of the new gas showrooms at Bristol, which was an outstanding example of what could be done in a large commercial city by a progressive gas undertaking. Those who had had the privilege of seeing the Bristol premises, or of reading about their new venture, should do all in their power in their own spheres to see that they were all up-to-date in the display of their wares. The B.C.G.A., he added in conclusion, wanted to transmit to them their warmest thanks for the admirable work done by gas salesmen during the past year. The year 1934 was remarkable in many respects, and the present Jubilee year would result in further progress in the Industry in which they were all engaged.

Presentation of Medals.

Sir FRANCIS GOODENOUGH, C.B.E., in making the presentation of the "Goodenough Gold Medal" to Mr. G. Bingham, of the Midlands Circle, for the best Paper presented to a Salesmen's Circle, remarked that the gas salesman was only stimulated by difficulties. He took off his coat and got to work with remarkable keenness whenever he had difficulties to deal with. They must be on their toes to-day or never; and salesmen from all over the country came to this meeting each year to obtain fresh inspiration and hope for the success of the future. The title of Mr. Bingham's Paper—"Effect of Changing Conditions on Gas Sales"—was very appropriate. They were faced to-day with changed social conditions as well as changed conditions of competition; but they were not going to be worried by unscrupulous competition, for the man who did not play fair did not in the end gain the sympathy of the public. The British public was very fair-minded, and the Gas Industry had the sympathy of the great mass of their consumers. In conclusion, Sir Francis emphasized that the B.C.G.A. stood for good service as the basis of all good salesmanship.

Mr. G. BINGHAM.

Mr. G. BINGHAM said how much he appreciated the honour that had been done him in making this award, and he thanked Sir Francis Goodenough personally for making the award possible.

The presentation of B.C.G.A. Area Silver Medals was then made by the PRESIDENT to members of District Circles.

Mr. B. BEWSHER expressed, in the name of all the Circles, thanks to the B.C.G.A. for the presentation of these awards, which gave each Circle very definite encouragement to submit really sound Papers which had been presented at their meetings.

The Sales Profession.

A very stimulating Address entitled "The Sales Profession" was then given by Mr. H. S. Weston, Sales Controller of Messrs. Wm. P. Hartley, Ltd., and this will be published in the April issue of the "GAS SALESMAN."

Mr. W. D. ROWE (General Manager of the B.C.G.A.), in proposing a hearty vote of thanks to Mr. Weston, said that they had listened to a tremendously inspiring Address. He had inspired them with the idea that salesmanship was something really worth while. He was greatly impressed with the value of the Salesmen's Circles, and he emphasized that in the B.C.G.A. they had the salesmen's friend.

Miss E. L. ILLINGWORTH (Chairman of the West Riding of Yorkshire Circle) seconded the vote of thanks, remarking that they would all go away with a fuller realization of the future of gas salesmanship.

Sir FRANCIS GOODENOUGH, in supporting the vote of thanks, emphasized that the art of selling was the art of pleasing and making friends. Friends were the greatest asset a salesman could have; no one dealt with people he did not like if he could help it. He hoped it would not be many years before the salesmen of the Gas Industry, like the doctor, had to be qualified before they would be allowed to practise. They had in the Gas Industry a Salesmen's Course which had been of the greatest value to undertakings and their staffs in giving practical training in salesmanship. They could no more teach salesmanship in schools than they could teach swimming on the drawing-room floor. The B.C.G.A. had a long life of increasing usefulness before it, and Mr. Weston's Address would go a long way towards qualifying them for the interesting and growing task they had before them.

Mr. D. G. HAGGETT (Chairman of the Northern Area Circle) proposed a vote of thanks to the President for taking the chair at their meeting. Edinburgh was fortunate in the possession of so live a man as Councillor Muter as Convener of its Gas Committee, while the B.C.G.A. were also extremely fortunate in having him as their President.

The PRESIDENT, in responding, said what a pleasure it was to be with them. If they went away fortified by the sound practical advice which they had received from Mr. Weston, nothing but good would follow.

Since its inception ....

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The PARKINSON CURVEX

MANY THOUSANDS OF GAS CONSUMERS HAVE FOLLOWED HIS EXAMPLE

To-day ...

the Curvex is recognised as the Gas Fire with the WIDEST DISTRIBUTION of RADIANT HEAT

AND GIVES THE GREATEST SATISFACTION TO GAS CONSUMERS

THE PARKINSON STOVE CO. LTD. ..... BIRMINGHAM

London Showrooms: TERMINAL HOUSE · GROSVENOR GARDENS S.W.1 *and at* MANCHESTER, GLASGOW, BELFAST, DUBLIN & WELLINGTON N.Z.

DAILY MAIL
IDEAL HOME
EXHIBITION

STAND Nº

51

GROUND FLOOR
GRAND HALL

he Public
terest in
AS... *again*
imulated by

Radiation

GROWING acuteness of competition in the effort to lure attention from Gas to the developments of competitive interests is very evident at the Ideal Home Exhibition. In keeping with the Radiation programme, this has been well anticipated and Stand No. 51 eclipses all previous Radiation efforts, notable as they were.

The number of visitors to the Exhibition always reaches a stupendous total, and Radiation feel that in making their stand such an example of the best progress in gas appliance design and construction, they are being privileged to help the Industry at a time when every ounce of propaganda counts.

Cookery demonstrations are given twice daily on the Stand, and the services of a lightning cartoonist have been retained, to interest visitors by clever sketches illustrating features of the latest gas appliances in an easily-understood way.

High 'Beam' gas fires with patent self-lighting tap are fitted in beautiful surrounds and are attracting a deal of attention, together with a full range of 'Sunhot,' 'Equator,' 'Newlyn' and 'K.C.U.' water heaters, in porcelain enamel and bright chromium plated finishes.

NEW WORLD

Regulo-Controlled

OOKERS & RANGES

Particular attention has been paid to ease of cleaning in the construction of this oven. The grey and white mottled enamelled linings are of a new type in which the white mottling is fused into one glossy surface with the grey background. The enamelled cast-iron gates are smooth and easy to clean. The oven burners and flue are protected by removable enamelled guard-plates, and the base of the oven is closed with an enamelled bottom-pan. The latter, with the exception of the handle, is made from one piece of stamped heavy-gauge steel.

Another unique feature of this cooker is in the method of adjusting the oven burners. For the first time both air and gas can be controlled *from the front*, and a small indication plate is mounted over each pair of controls clearly marked: AIR—GAS. It is impossible for either adjustment to be disturbed when cleaning the oven burners and the cooker base.

CANNON IRON FOUNDRIES, LTD., DEEPFIELDS, Nr. BILSTON, STAFFS.

London Office and Showrooms : Thames House, Westminster, S.W. 1.

North British Association of Gas Managers

Spring Meeting at Dunfermline

The Spring Meeting of the North British Association of Gas Managers was held in the City Chambers, Dunfermline, on Friday, April 5, under the presidency of Mr. GEORGE BRUCE, of St. Andrews.

THE PRESIDENT.
Mr. GEORGE BRUCE, of St. Andrews.

Provost D. J. MacKay extended, on behalf of the Corporation and citizens, a very cordial welcome to the Association on their visit to Dunfermline. This was not the first occasion on which the Association had visited Dunfermline, and he hoped that they had returned because they had found Dunfermline a convenient and attractive centre. He trusted that they would combine interest with pleasure and would find time to view the amenities of the town which was the ancient capital of Scotland. At the Corporation Gas-Works they would find many things of interest, and in their Gas Manager Dunfermline had one of the best in the country. He could say, without flattery, that Mr. Campbell was not only a manager but he was a man. He was an ex-President of the Association and was thoroughly respected as a public official in Dunfermline. He and his staff were carrying on the work of a large gas undertaking which had been greatly extended and were providing the neighbourhood with one of the essential supplies. The developments which had taken place in recent times within the Gas Industry were remarkable and were a tribute to the zeal of gas managers. He concluded by wishing the Association all success.

The President thanked the Provost for the cordial welcome he had extended. His reason for having this meeting here was that he thought it better to give preference to the old capital of the country. Both Dunfermline and St. Andrews, where the Autumn Meeting was being held, were closely linked in the history of Scotland. He wished to express his thanks to Mr. Campbell for his assistance in arranging this meeting. He had done the bulk of the work in an unassuming but efficient manner.

The Hon. Secretary (Mr. A. Kellock) then announced that apologies had been received from Mr. C. Valon Bennett, the President of the Institution of Gas Engineers, from Presidents and Secretaries of kindred Associations, and from members of the North British Association.

The President said that the meetings of the Association always recalled pleasant memories, but these were sometimes tinged with sadness. This year they had to record the loss, by death, of four members. They were William Brown, Glasgow; Charles Fairweather, Kilmarnock; William Williamson, Forres; and Fred. Lamb, Manchester. Out of respect for these members the meeting observed a minute's silence.

The President, the Hon. Secretary, and some of the members.

Presidential Address of George Bruce, St. Andrews

When last September you did me the honour of electing me as President, I accepted with not a little misgiving, as I felt I could not attain the high standard of my predecessors, but I am sure I can count on your support to make the year 1935 a beneficial one to the North British Association. Again allow me to express my sincere thanks for the honour you have conferred upon me.

Someone asks why conferences are held. Do we not meet that we may take stock of our affairs, that we may set our house in order, and particularly that we may discuss the direction of our progress and the moving spirit that directs that progress? Also for the purpose of raising the status of our members, and as a means of bringing together those who have a common interest in the welfare of our Industry? It is on these lines that I am giving my Presidential Address to-day.

Introduction of Gas to St. Andrews.

This year, 1935, is the centenary of the introduction of gas into St. Andrews. It will, therefore, be appropriate if I deal with the progress of the St. Andrews Gas Company in the first part of my Address.

One of the first difficulties at the beginning of the Company was to find a suitable site—a very difficult matter in a city which is a University centre, and which cherishes its amenities. Several years passed in apparently fruitless discussion, but in the end a site was chosen at the back of the old Cathedral and quite close to the Harbour. The Harbour in these days was the principal centre of transport, and our coals were literally delivered at our own door.

The sum required for the erection of the works was £3,600, and the price of gas was fixed at 14s. per 1,000 c.ft. It is worthy of note that two of the first Directors of the Company were University Professors—Dr. Alexander, Professor of Greek, and Professor Duncan, Professor of Mathematics. Dr. Adam Anderson, Rector of Perth Academy, who had introduced both water and gas into Perth, acted as consultant at the erection of the works. Mr. Fowlis was appointed Manager in 1835, and left the Company in 1850 on his appointment as Manager to Paisley Gas Company. His successor was Mr. J. C. Hall, who acted as Manager from 1850 to 1903.

Illumination of the streets of St. Andrews by oil lighting was proposed by the Town Council in 1796, and was not carried out until 1821. In 1835 oil was displaced by gas, the number of lamps then being 104.

One cannot forget, at this Centenary, Sir Hugh Lyon Playfair, who was Provost of the city from 1842 to 1861, and Chairman of the Gas Company from 1842 to 1849. For a quarter of a century no man in St. Andrews attracted so much public attention. His life during these years was identified with an era in the history of the city. For many generations St. Andrews had been going backwards, and it was he who was destined to restore it to that state of beauty which had rendered it one of the finest cities in Britain.

For the first twenty years the progress of the Company was relatively slow. By 1855 the gas manufactured was 3½ millions. In 1918, when I was appointed Engineer to the Company, the figure was 46 millions, and to-day, in 1935, the figure is 100 millions. Our carbonizing plant consists of two benches of 8 retorts and two benches of 6 retorts, but we depend on our carburetted water gas plant for fully 50% of our gas manufacture.

Water Gas Plant.

As water gas takes a prominent part in our system of manufacture, some of the particulars of the development of our water gas plant will be of interest.

In 1922 the Company built a large water gas house and installed therein a small blue water gas plant, capable of making a little over 200,000 c.ft. per day. This small unit now forms part of our two automatically operating carburetted water gas plants completed in 1934, which together make well over 1 million c.ft. of gas in the 24 hours.

The plant has been built in four separate stages. As previously mentioned, we first built our blue water gas plant in 1922. This was followed in 1926 by a hand-operated carburetted water gas plant erected alongside. As with the blue water gas plant, all the controls are on the ground floor, which makes cool and comfortable working for the operators. The carburetted water gas plant works on the back-run system.

Automatic operation having reached a very high state of perfection, further developments were considered, and my Directors in 1934 sanctioned a scheme for completing the blue water gas plant, and transforming it into an automatically operated carburetted water gas plant, the existing generator and scrubber and many of the parts being used again. Immediately on the completion of this work the makers were asked to provide automatic operation for the other set.

With the dual system of gas manufacture—*i.e.*, coal gas and water gas, it is difficult to credit the water gas plant with all the savings it effects. The back-run process combined with automatic operation has greatly cheapened our cost of production. It is impossible to work a water gas plant by hand as efficiently as by automatic operation. Our fuel consumption per 1,000 c.ft. of blue water gas made, is now less by about 20% than it was with our original blue water gas plant. The gasmaker is now free to leave the plant to fetch coke, and to attend to other work while gas-making proceeds. Suitable alarms are provided for calling attention if necessary.

The installation of a water gas plant has enabled us to discontinue slow-firing or slow working in the retort house, which as you know is uneconomical in every way, and we have a complete carburetted water gas plant in reserve which can be brought into full operation in a couple of hours.

Further Reconstruction.

The rest of the plant at the works has all been reconstructed since 1918, the holders also being practically new. One 200,000 c.ft. holder being erected in 1927 and one 250,000 c.ft. holder in 1933. In the year 1930 we installed a "Dri-Gas" plant, designed and erected by Messrs. W. C. Holmes & Co., Ltd. It is worked in conjunction with our washing for naphthalene removal, there being two rotary brush washers worked by a steam engine between them, one washer containing gas oil, the other calcium chloride solution. The chloride solution is drawn from the stock tank by a plunger pump worked by the washer engine, then sent through rack coolers to the washer. After passing through the washer the solution returns to the stock tank. A small portion (about 5%) of the solution is bled off from the pump outlet to the evaporator, heated by exhaust steam from the washer engine, by which the strength of the solution is maintained. The amount of water evaporated from the chloride solution is equal to that extracted by the solution from the gas in the washer, hence the solution strength is constant.

The plant has worked continuously and smoothly, requiring no attention beyond greasing, daily testing of the solution strength (usually maintained at 74-76° Tw.) and occasional addition of fresh chloride. The cost of chloride replacement last year was £8 16s. for one ton of chloride, or 0·022d. per 1,000 c.ft. of gas sold. This and other costs have been more than compensated for, first, by the remarkable reduction in service complaints, and, secondly, by a similar reduction in meter repairs. I am unable to give you detailed figures, but a fair estimate of the reduction of complaints is 75%. The district has now completely dried up, and syphons require no pumping whatever. An example of actual figures obtained is as follows:

Dew Point of Gas.

	°F.
(1) At outlet of "Dri-gas" plant	31·9
(2) At outlet of holder	32·8
(3) District (showroom)	33·4

No troubles with regard to plant corrosion, dust and gum stoppages on the district have been experienced. I am of the opinion that gas-drying should engage the attention of every Engineer. It is true that a drying plant does not produce a saleable commodity, but the expenditure saved on unremunerative service complaints is no small item, and "money saved is money earned." Further, by helping to ensure constancy of supply and pressure, that very important commodity—satisfaction to the consumer—is obtained and held.

Distribution.

For a number of years our distribution system was a continual source of worry to us, owing to the small mains and choked services; but by giving a great deal of attention to enlarging mains and renewing services, this trouble has been practically overcome.

In laying new mains to the housing schemes, we lay them in the background of the houses, which means that we require two mains for each street. This increases the cost, but it causes a saving in service pipes, as the service is generally not more than 6 ft. in length to each house, and

it does away with the long service required if the mains are laid in the roadway. This method would not be used for private houses, but it coincided with the interests of the local authority; for it was in their interest that breaking up of the road for new connections and services should be avoided. Then, as the houses were owned by the local authority, access could be given to the Gas Company to make the necessary renewals.

We have made a 4-in. pipe our minimum size for a main in the district, and a 1-in. pipe as a service pipe to domestic consumers, and a ¾-in. pipe for street lamps. In our housing schemes, the supply to the cooker in every case is a ½-in. compo pipe, and we have carcassed 95% of the gas fitting of our housing schemes, and, although not asked in our schedule, we have in every bedroom laid a pipe to each fireplace, so that if the householder requires a gas fire, the service is there. A free maintenance scheme has been in operation for the past 18 years, only the material being charged to the consumer for the work done.

During the past year we have taken pressures all over our district, and at the peak load the minimum pressure was 3 in., the pressure at the works is maintained at 6 in.

Sales.

In 1920 we took over a shop for a showroom, and in 1927 we removed into the old City Hall, which was converted into a beautiful showroom, which can compare with most showrooms in its attractiveness.

Our sales during the past few years have averaged two to three thousand pounds per annum. We completed a survey of all our consumers in regard to the amount of appliances used by them, and the following table is the result :

Total of Prepayment Meters.	All Gas.	Gas and Electricity.
1,265	1,097	168
Wash Boilers	Fires	Gas Irons.
450	305	292
Portable Heaters.	Cookers.	Water Heaters.
40	702	9

The average consumption per prepayment consumer is 21,000 c.ft.

Total of Ordinary Meters.	All Gas.	Gas and Electricity.
1,502	709	793
Wash Boilers.	Fires.	Gas Irons.
236	1,211	400
Portable Heaters.	Cookers.	Water Heaters.
400	1,000	80

The average consumption per ordinary consumer is 41,000 c.ft.

We are fortunate in having 75% of our cookers in enamelled finish, and expect that within a year or two we will have done away with any black finished cookers now in use.

Prices of Gas.

	Per 1,000 C.Ft. s.	d.
For a two monthly consumption not exceeding 3,000 c.ft.	4	0
For a two monthly consumption exceeding 3,000 c.ft. but not exceeding 25,000 c.ft., the above rate for the first 3,000 c.ft. and for the remainder	3	9
For a two monthly consumption exceeding 25,000 c.ft. but not exceeding 50,000 c.ft , the above rate for the first 25,000 c.ft. and for the remainder	3	6
For a two monthly consumption exceeding 50,000 c.ft. but not exceeding 100,000 c ft., the above rate for the first 50,000 c.ft. and for the remainder	3	3
For a two monthly consumption exceeding 100,000 c.ft. the above rate for the first 100,000 c.ft. and for the remainder	2	10
[The calorific value of the gas supplied is 450 B.Th.U.]		
Street lighting	2	3

We have a contract for five years for the lighting and maintenance of street lamps.

Centralized Administration.

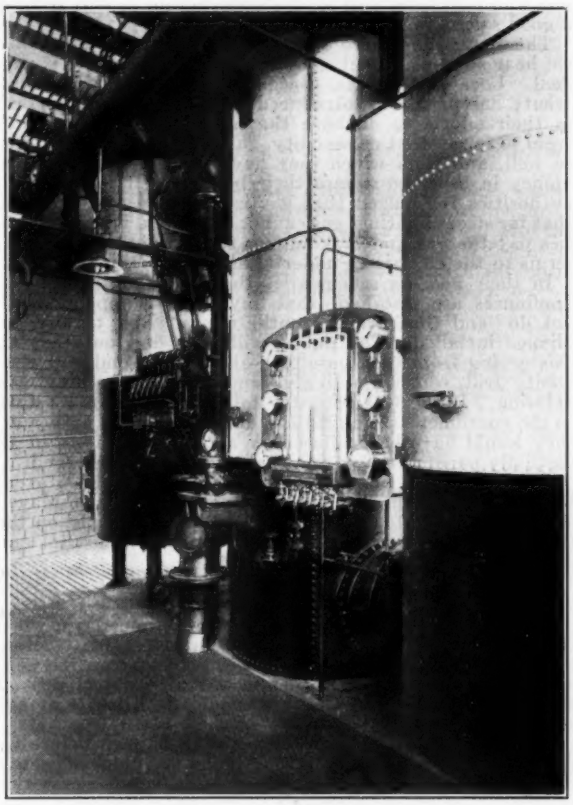
Now, gentlemen, I do not intend wearying you with my own Company's affairs, but would like to deal with problems which concern us all.

Since 1918, at nearly every one of our annual Meetings, the question of centralized administration has been raised. In 1929 the Government passed the Local Government Act, so that local administration was centralized. Anyone who is in touch with municipal affairs cannot but admit that that has been a complete failure, resulting in inefficient service and costly administration; so in view of this experience we have to be careful, and weigh up every advantage and disadvantage before we consider centralization or amalgamation of gas undertakings.

I admit where works are quite near one another, and where financial terms can be arranged so that the capital of the company is not overloaded, that in these cases it would be an advantage to undertakings to amalgamate. Small works if at all possible should get their supplies in bulk from large undertakings, who can make it possible for them to sell gas to their consumers at a lower rate than they could make it.

Let us look around at our own Scottish undertakings. Where amalgamation has taken place, we find in some cases that the price of gas to consumers has risen. During the past few months an attempt was made by a financial company to acquire the gas undertakings owned by the companies in Fife, but I am glad to say the companies unanimously agreed to refuse to have anything to do with them.

To me the time has come to tell these financial promoters, within and without the Gas Industry, that progress is not in their hands, but can only be achieved by close co-operation within the Industry itself. Company undertakings are baffled and perplexed at so many different sets



Humphreys & Glasgow C.W.G. Plant at St. Andrews.

of promoters who during the past few months have been trying to acquire their undertakings, and there has grown a sense of insecurity among managers and directors alike. To me it should not be so, for it only bears out that the Industry is considered by financial experts as an investment where one can put one's money and get a good return; hence the reason of their trying to acquire gas undertakings.

Extinction of the Smaller Concern.

Surely we Scottish people know when we have a good thing, and I am quite sure we have the good sense to keep it in the hands of those who know the Industry, and have carried it through many rough passages, and now see the reward of their labours in an Industry which is second to none in efficiency. We are living in an age when combines and mass production are the order of the day. The massing of vast industries together and the massing of small companies into one supreme unit will surely have one end only—" the extinction of these smaller concerns who in the past have given good service to the nation, and generally in these small companies there was a bond of good feeling between customer, employer, and employee."

One of these problems, especially in the Gas Industry at the present time, is that a few months ago a group of coal owners combined together to have a central selling agency, and no doubt in the near future the rest of the coal owners will follow their example. I am quite sure this will not

lessen our difficulties, for is this not a method to get increased prices for coal. The coal industry may need increases, but the public do not take into consideration that gas undertakings are paying more for coal when they question the price of gas.

The Best Market.

In turning again to gas combines. These are generally run by people who have interests in the different products which are required for gas undertakings. Under these circumstances it is difficult for those who have direct control in purchasing materials to get the best terms for the company. Is it not the aim of any business to buy in the best market at the keenest price? We in the Gas Industry should be free from any restrictions that hinder us from getting the best terms for our undertakings.

Someone will say, no doubt, this does not concern us; but to me it is essential, and is just as important to have one who purchases well for his undertaking as it is to have a good salesman.

The most urgent need of the Industry in these days when we hear so much about new deals is that we get a square deal. Local authorities, especially in centres where electricity has just been introduced, seem to have gone crazy in their efforts to advance the sale of electricity. They seem to forget that commodity, gas, which has served them so well, and from which they have derived large sums of money in order to square their budgets. It is time that authorities recognized that gas is not a spent force, and that for street lighting, gas cannot be beaten, if the authorities pay the gas undertakings for street lighting in similar terms to the electricity undertakings.

In their housing schemes let them see that proper gas appliances are installed—that any inferior appliance will not do—and that proper ventilation is given to any appliance installed. The public will soon find out that all this crying from the house-tops about the wonderful electricity grid, which was to give something for nothing, is a delusion. If the Gas Industry failed so often in its duty to the consumer as the grid has done during the past year, they would have been abused by anonymous letters in all the daily papers and by the local authorities concerned.

Everyone of us knows that electricity has been a great boon to civilization, but the Gas Industry has also played its part for over 100 years, and I believe it is only on the threshold of further achievements, both in industrial and domestic spheres.

Self-Examination.

Some of you will remember that in the old days, when the Preparatory Service was held on the Friday before Communion Sunday, at both services the congregation were lectured on that theme, "Let us examine ourselves." I think it is appropriate that we should do likewise at our Spring Meeting.

Are we still waiting to see what is to happen before we make extensions to our works, or make our plant efficient? Are we contenting ourselves with waiting at our gas-works, waiting till someone may call to see what apparatus and appliances we have? If we have a Showroom do we use it to the best advantage? Let us be certain that it is appliances which we actually show to the public, and not mere showcards and illustrations. Before cheap gas can be produced we must keep our plant at the highest point of efficiency, and in distributing our commodity we must secure that every gas consumer has a supply adequate to his needs.

To me, at the present time, the sales department is the most important. It is imperative that every undertaking should have a showroom, and a showroom where appliances can be seen. It is almost hopeless for a salesman to sell appliances when he has only the maker's lists to show. He may effect a sale, but he will do much better if he can show his inquirers the very articles they are to get. This is the only way to ensure satisfaction, the satisfaction which comes from having seen what one is getting, and from the knowledge that it will be fitted at once. In our showrooms, if at all possible, there should be on exhibition only such appliances as we can assure our customers are thoroughly efficient.

We are indebted to the manufacturers of gas appliances for their progress in the past few years, both in the efficiency and the attractiveness of their appliances. Take the cooker which we most depend on. The porcelain gas cooker has won many friends, and conquered many prejudices among those who formerly would not dream of cooking by gas. Personally, I think the days of the black cooker are past and gone, and for the past few years I have not bought one of them.

Some undertakings still persist in supplying black cookers to their customers, but I consider this is sure to lead to trouble. No doubt in some cases this policy is dictated by force of circumstances, but wherever it is possible, I think it will pay to depart from this practice.

In regard to water heating for domestic use, there is a great opportunity for additional business, and it is up to every one of us to push the sale of gas for that. We cannot complain that the appliance we have to offer is not efficient, for there are many efficient appliances on the market.

As there are a great number of our members here to-day representing manufacturers of appliances, I would say to them there is no good in the representative calling on undertakings and soliciting orders for goods if they cannot give delivery for two or three months after the order is given; for there is nothing causes more dissatisfaction to consumers than having to wait for months after placing an order. Undertakings should cut off this kind of firm altogether, as they are only hindering the progress of the Industry. It is time for manufacturers, as well as gas companies, to carry stocks of appliances, so that they can meet the requirements of their customers.

In addition to the work that is done by the showroom, we cannot neglect to use the weapon of advertising, no matter how much our own Associations and manufacturers may advertise. In our own districts we should see that gas is advertised in our local Press, and also keep in personal touch with the public, and impress upon them the importance of gas. In these days of over production, when all sorts of Marketing Boards are being formed to push the sale of different commodities, let us be up and doing. Do not let us shuffle through, but adopt methods which will ensure prosperity to the Industry.

Another topic of our discussions of the past which has been much laboured is the education of the Gas Engineer. It is becoming a more difficult problem every year, especially in regard to those in charge of small and medium size undertakings. Sometimes one would think that a good organizer is more essential than a good Engineer, for he has not the staff to delegate to the various duties of works, distribution, and sales—so he must allocate his time to do all these various duties himself.

It is different in a large undertaking, where an Engineer may employ a chemist, a distribution superintendent, and a sales manager to carry out the said duties. There is no one more interested and anxious that our young men should possess the highest technical knowledge; but in addition to this, something else is vitally necessary, without which the most brilliant scientific student will fail when it comes to a matter of practice. This is common-sense. With the gift of common-sense he is well on his way to mastering his difficulties. With its help he can deal with customers with understanding and sympathy, and a realization of their immediate needs. In this way benefit accrues to his customers and to us.

I have been brief in my remarks to you; deliberately so. I have cut out padding, for I believe in the efficiency of the Industry from the manufacturing side, and I know that little needs to be said on that side. You will pardon me, therefore, if I have dwelt with more than usual emphasis on the sales side.

In conclusion, there lies before us a great field of business, and though we have achieved much in the past, more still remains to be done. Let us use all our resources at our disposal to further our Industry, and the result will be prosperity not only to ourselves but to the nation.

Vote of Thanks.

A vote of thanks to the President was proposed by the SENIOR VICE-PRESIDENT (Mr. R. D. Dickson, Kirkintilloch), who said he wished to show his appreciation of the President's service to the Association in delivering such an interesting and helpful Address. Nowadays few need be ignorant of the progress of the Industry, since the Technical Press was so excellent, and it was therefore very difficult to mention, in an address, any points of general progress which would be entirely new to listeners. It was therefore wise to consider, in an address, the progress of one's own undertaking, as this would act as a stimulant to everyone. He complimented the President in his courage in raising the question of gas grids and amalgamation, and agreed that if the Industry were left free from political and other interference it would be able to carry on very efficiently.

The vote of thanks was supported by the JUNIOR VICE-PRESIDENT (Mr. James Jamieson, Edinburgh). He said he fully subscribed to all the proposer of the vote of thanks had said, and though it was customary to refrain from discussing a Presidential Address he would like to say how much he admired the public-spirited attitude of the Fife Gas Undertaking in dealing with the approaches of the financial concerns which were operating in their midst. It

Further "snaps" at the Dunfermline Meeting.

was one of those delightful examples of the interests which gas administrations had in their consumers, and he hoped that it had been appreciated by those who were sure to benefit by it.

The PRESIDENT, in reply, said that most success came from being able to see work delegated. He was very fortunate in having two Vice-Presidents to whom the work could be safely delegated.

Nominations were then received for two vacancies on the Council and the following four members were proposed and seconded: R. D. Keillor, Greenock; R. Sturrock, Ardrossan; D. A. McIntyre, Montrose; R. M. Simpson, Denny.

Proposed Lanarkshire Gas Grid.

A short Address was then given by B. WYLAM, Ph.D., A.I.C., H.M. Inspector of Alkali Works and Adviser to the Commissioner of the Distressed Areas in Scotland, Sir Arthur Rose. Dr. Wylam said that he had been asked by the Commissioner to investigate the possibility of a gas grid in Lanarkshire and Renfrewshire to absorb coke oven gas which will be available in a short time from coke plant to be erected. He had no experience of the manufacture or distribution of gas, and he was therefore turning to the practical men of the Gas Industry for assistance. He had long had very definite views on gas and gas manufacture and he agreed with the President when he said that gas was not a spent force. It should be gas and still more gas. It was one of our most important national industries, and it was not only gas that had to be considered but the by-products which were the raw materials of chemical industry. He was a chemist himself, having been engaged for some years in the manufacture of dyes. Gas was a great and important industry and he wished to do all he could to assist in the formation of a grid. He viewed the situation from an impartial point of view and he wished to pool information from both sides. He had issued an interim report containing a tentative scheme. Unfortunately he had not time to discuss it in detail but he would mention one or two points. In the first place it might be argued that the scheme was not comprehensive, since it did not deal with administration. He did not intend it to do so, but wanted a tactical method to start with. He wanted the method to be evolved and agreed upon by the whole of the Gas Industry.

It might be suggested that the scheme was not a grid in the true sense of the word, but it was his intention to put forward a scheme whereby gas could be distributed over the greatest possible area at the least possible cost. He had no intention of evolving an expensive scheme and hoping for the best. He wanted a sound technical scheme which was not too optimistic and not too dear. Some of the report was controversial but it was his intention to invite controversy. The President had referred to the taking up of gas undertakings and to recapitalization. This had no part in his scheme. He was mainly concerned with distribution and would leave undertakings to do their own job. The scheme he had put before the Industry was only a temporary edifice not bound or cemented in any way but built up of one stone on top of another. It could be torn down, and he invited the Industry to do so, but asked them to polish the stones and round off the corners and return them to him in the form of constructive criticism so that he could rebuild. The edifice would then be built on a solid foundation and would be backed by the goodwill of the undertakings. It would then advance not only the Gas Industry but Scottish industry as a whole.

The PRESIDENT proposed a vote of thanks to Dr. Wylam, to which he suitably replied.

It was then announced that Prof. William Bone would deliver the William Young Memorial Lecture at the September Meeting in St. Andrews when there would also be a Paper delivered by Mr. Thomas Carmichael (Engineer and General Manager of the Portsmouth Gas Company), who was a member of the North British Association.

Luncheon.

After the meeting a luncheon was held in the Masonic Hall, and more than 150 members attended. After the Loyal Toast had been observed, the toast of the President was proposed by Mr. GEORGE BRAIDWOOD, Coatbridge. Mr. Braidwood said it was a great honour to have Mr. Bruce in the chair. His demeanour and quiet methods had appealed to everyone. They all knew what Mr. Bruce had done; he had doubled his output and a great many envied him his position as Gas Manager at St. Andrews.

Mr. BRUCE replied and thanked the members for the gratifying attendance. There was a serious problem before the Gas Industry to-day, and he felt sure that if financial interests got control of the Gas Industry there would not be much prospect for the younger men. He advised every Scottish undertaking to watch this position closely, and asked why all the money should go to London. The political weapon was being used in every industry, but the Gas Industry must have a free hand. He cited the case of the Dundee jute industry, which, he said, had been ruined by organization. Before becoming keen on amalgamation all the facts should be examined and the consumer considered. The gas undertakings must stand together if the progress of the Industry was to be maintained. The people who used the gas should be taken into the company, not those who paid fleeting visits from London. Taking a long view he was sure that it would be clear that the only way in which the Gas Industry could be furthered would be by the hard work of those in the Industry. Nothing worth while was ever obtained without hard work, and it was only hard work that brought success.

A vote of thanks to the Secretary, Mr. Arch. Kellock, Airdrie, was proposed by the PRESIDENT, and Mr. KELLOCK suitably replied.

Works Visit.

In the afternoon members of the Association took the opportunity of inspecting the Corporation Gas-Works. They were received by Mr. Campbell and his assistants, and conducted in parties round the Works. One of the outstanding features of the Works was the neatness of lay-out and the general tidiness, and among the interesting things on view were the new holder and the new high speed compressor which is capable of working against 20 in. and deals with 75,000 c.ft. per hour. A very interesting demonstration of metal cutting by the oxy-coal gas flame was arranged. During the visit afternoon tea was provided.

Golf.

The Golf Outing was held at Dalmahoy, near Edinburgh, on Thursday, April 4. It was a day of brilliant sunshine and biting cold wind, but in spite of the rather adverse conditions the outing was pronounced a huge success by the 46 members who took part. At the close of play an informal meeting of the Golf Circle was held, at which

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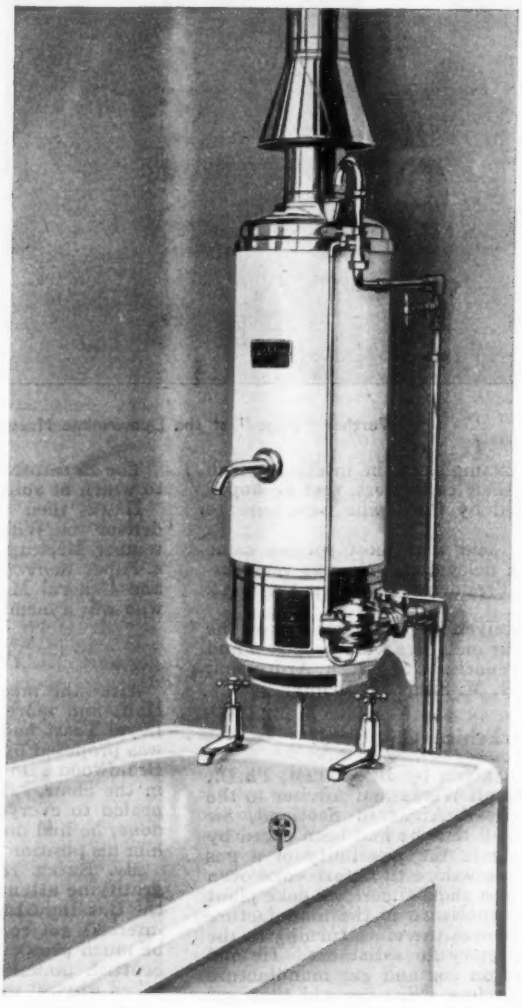

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Captain Hudson presided. The prizes were presented by Mr. Bruce, who was accorded a vote of thanks on the proposal of Captain Hudson. Captain Hudson said that he had been rather doubtful in taking over the office but he had found that it entailed no work at all as Mr. Scott attended to everything and all the praise was the latter's due. They were also indebted to the Captain and Committee of Dalmahoy Golf Course for the privilege of being allowed to play over the course.

Mr. SCOTT said that he had received best wishes from ex-Captains MacLay, Wilson, and Bell. He thanked Captain Hudson for his remarks and said that he would convey the Circle's gratitude to Captain Poole, of the Dalmahoy Golf Club.

RESULTS OF GOLF COMPETITION.

J. Winson Scott Silver Cup.—M. D. Campbell, Bridge of Weir

	1st Handicap	C. Gray, Leigh-on-Sea
	2nd ,,	L. Bain, Jnr., Leven
Tie	3rd ,,	D. Fulton, Helensburgh
Tie	4th ,,	C. Hamilton, Loanhead
Tie	5th ,,	R. B. Waddell, Polmont
Tie	6th ,,	R. Stewart, Auchterarder
Tie	7th ,,	Allan Young, Edinburgh
	Scratch prize	John Pollock, Glasgow

Gasholder Inspection AND Maintenance

by LEONARD BOTT

In a Paper read before the Midland Junior Gas Association on April 4, Mr. Leonard Bott touched upon some of the more useful points in the important subject of gasholder inspection and maintenance.

For considerably more than a century, gasholders have given valuable and reliable service, both to the Gas Industry and to the community. In the earlier days they were of comparatively small capacity and simple design. They were constructed of an elemental metal with very high resistance to corrosion, and they reserved a gas which actually preserved its containers. So consistently good and trouble free was the performance of these "gasometers," and so long their working life under those ideal conditions, that there is a probability that all of us have not fully realized the very decided change which has taken place in all these features.

Progressing with the trend of structural engineering and the increased demand for gas, gasholders have developed to comparatively huge proportions. They are now of more complex design; the material mostly used in their construction is a compound metal very susceptible to oxidation and decomposition, while the gas they have to contain often encourages wasting of the internal surfaces where its presence and progress are easily overlooked, and a remedy is difficult to apply.

It is reassuring to find that, following the activities and recommendations of the Gasholder Sub-Committee of The Institution of Gas Engineers, the managing engineers are recognizing the necessity and economy of more frequent inspection. My own increasing activities as an independent inspecting engineer show that the following opinion, expressed by the same Sub-Committee, was somewhat prophetic:

> That advantageous arrangements for annual inspection should probably be made with a third party, when required, without the necessity of entering into a policy of insurance.

It is not exclusively for indications and consequences of deterioration that a gasholder inspector must seek; there are instances of faulty design such as girder and standard flange plates with rivets spaced too far apart, channel bar guides attached to standards by bolts 5 ft. apart, and many other such anomalies.

My conviction is that inspection should begin with the drawings and specification of all new gasholders and maintenance at the time the gasholder is accepted from the makers.

Extensive repairs, reconstructions, or addition to a telescopic gasholder of any design call for more experience and resource than the erection of a new gasholder of similar design. Where a gasholder has been originally constructed by one firm and, later, extended by another, it is possible for the managing engineer to have trouble for which he cannot justly be held responsible.

An expert gasholder inspecting engineer must be a man of long and varied experience, must have actual experience of design, construction, erection, reconstruction, and the ordinary working of the holders in the gas-works.

In a Paper dealing with "The Upkeep of Gasholders," Mr. R. J. Milbourne said: "Periodical inspection by qualified experts and prompt rectification of any disclosed defects should be an invariable rule."—"Qualified Experts; Prompt Rectification." There you have the whole secret in a slogan.

The common aim of managing engineer and inspecting engineer should not be confined to keeping the gasholder going uncomplainingly, but to get the most perfect action and the longest possible life from it. Any reasonable expenditure which secures this is wise economy.

Inspecting a "Spiral."

We will now proceed with the imaginary inspection of a two-lift "spiral" in a steel tank. If possible, I prefer to inspect from the full condition, downwards; with this direction we detect any loss of gas when the lifts uncup. Our first attention will be given to the steel tank. If it is entirely above ground we can ascertain whether it is watertight. Should water run from beneath the bottom curb the only permanent cure is to empty the tank; if there be leakage of the riveted joints of the side plates, an experienced caulker can remedy that—an inexperienced man will make it worse.

We now proceed to examine the disposition of the guide carriages—these are attached to the tank top and engage the spiral rails on the outer lift. If the tank is supplied with a view to future extension, the carriages will be on brackets overhanging the tank water space. The guiding system of a "spiral" consists of the carriages and engaging rails. We are really economizing when deciding on a "spiral" gas holder, but it is decidedly false economy to endeavour further to save money by accepting an inadequate guiding equipment—this should be of the very best and accurately set.

The guide rails on each lift can be relied upon to be equidistant around the circumference; therefore, if the gasholder is to function freely and have a reasonably long life, the carriages engaging these rails must be equally spaced and perfectly level one with another. As the rails are set at 45°, it follows that any error in level is equal to the same amount of error in circumferential pitch.

When a spiral guide rail is centrally placed between its two engaging wheels there is an allowance of three-sixteenths of an inch only, on each side. This, however, is not to allow for inaccurate fixing, but for any deviation from truth by the rails. Too great care cannot be taken in getting the carriages perfectly correct. Usually the position of the dip carriages (I wish to say here that the terms "dip" and "grip" are synonymous) are fixed by the works, while it is not safe to fix on the positions of the carriages on the tank top until it is full of water. If it should be found that the lifts are eccentric with the tank to the amount of 2 in., it is quite easy to correct the two carriages which are on the diameter of maximum error; the remainder, however, have to be moved obliquely or sideways, in pairs. To attempt to centralize the eccentric lifts when landed, by propping all round with props of one length, does not assure accuracy, because the natural tendency of such an operation is to make the tank elliptical on one diameter and the lifts elliptical on the diameter at right angles to the first. Besides, such an attempt would results in lifting one side of the lift off the rest blocks.

All spiral carriages have a radial movement of the axles provided, of about three-quarters of an inch—three-eighths of an inch of this is to permit of the play allowed in the width previously described, and the remainder for expansion and contraction, also for accommodating the

general tendency to barrel shape which lifts, especially deep ones, have.

With the necessary information we may proceed with our inspection. At every carriage we shall require the following information: Distance from side sheeting to the tank; position of axles relative to the radial movement provided; which wheel is in contact with rail; whether there are indications of regular oiling; depth to surface of tank water from top of tank; height of the carriage above the surface of the water.

The gasholder may now be deflated, and while it is descending a keen look out will be kept for signs of corrosion or leaks. Watch for signs of increased diameter when the guide wheels arrive at the halfway position, and, before the outer lift is liberated, inspect the top or roof sheeting for leakage while the maximum pressure is on it.

The outer lift may now be landed and the water in the cup watched for any agitation indicating loss of gas during the uncupping.

Before the bottom of the cup is out of reach, feel for silt and foreign bodies there; also examine most closely and thoroughly the sides for corrosion. This done, we measure up at each dip carriage as follows: Distance from inside edge of dip channel to side sheeting of inner lift, distance from outer edge of dip to inside of tank, height of dip channel above surface of tank water; also record the positions of wheels radially and tangentially; ascertain whether there are indications of regular lubrication. Complete the inspection of the sides and roof for corrosion and condition of paint. The inside of the tank should now have attention to ascertain how it is resisting corrosion at the " wind and water " line and upwards—if there are signs of attack it will be well to syphon 1 ft. or 18 in. out of the tank water, thoroughly scrape the space so exposed and coat with Humadine. The cup can also have its water level lowered and receive the same treatment, immediately the outer lift is disengaged.

There is a variety of spiral guide carriages, none of which can be fully discussed here. Some desirable features to insist upon follow: The axles should be sufficiently robust to be still strong enough after they are considerably worn. The support of the housing should be brought as close as possible to the wheels, the latter being free of long-extended bosses. Automatic lubrication or Stauffers " Tell Tale " cups.

A common fault among " spiral " carriages is that the outer flanges of the wheels do not get all the wear from the rails because of their small diameter; this results in excessive wear on the rail edges and leaves a ridge of unworn bulb up the centre of the rail.

Lubrication.

Reverting to the vital subject of lubrication (and these remarks apply to both kinds of gasholders), the duty of lubricating is apt to be given a miss in bad weather and one has to go to close quarters if one is to ascertain whether a recent visit has been paid. Oil holes in wheel bosses generally become filled with rust and painted over. The grease-gun nipple is subject to the same trouble. An automatic self-feed supplied with weather-resisting oil is better, but the " Tell Tales " of ample proportions give, from the ground, visible indication on the largest gasholder with the aid of binoculars, and they give continued pressure, whereas the grease gun gives a momentary pressure only. A further and important good feature for the Stauffer is that the outlet can be arranged to leave the axle at the proper place—viz., the bottom, where the space is available to receive the grease. When oil holes and grease-gun nipples are convenient for feeding, the bottom of the hole or outlet is usually closed by contact with the axle.

Although I am the inventor of two accepted designs of spiral carriages, both of which have a four-wheel variety, I am not an advocate of that kind of carriage. It appears to me that, having increased the number of *rails* on the lifts, the two-wheeled carriages remain sufficient, because their number is also equally increased.

Peculiar features of spiral gasholders are: The cups require cleaning out frequently, because the collected silt is deposited in heaps at the bottom of each rail.

If the side sheeting is continued upwards higher than the top curb, the dirt washed down from the roof sheeting lodges among the rivets of the top curb, remains damp, and encourages rapid corrosion.

These continued side sheets, both on top curbs and dips, tend to corrode very rapidly and need cleaning and painting three times as often as the gasholder generally.

The carriages on the topmost dip and engaging the rails of the innner lift are often in a fixed or cupped condition for several months. If they do not receive special lubrication the axles become rusted into the wheels and fixed. Carriages with the wheels integral with the axles and provided with an oil bath stand this stagnation fairly well—one of this kind has a special oil cup to be used under the conditions named.

If a " spiral " is where children play it will be found necessary to protect it from stones which would get in the carriages. A gas-works in Northern Ireland fenced halfway around theirs with wire netting to avoid such danger.

Inspecting a " Guide Frame " Gasholder.

We will now turn our attention to a guide-framed gasholder of three lifts in a steel tank, entirely above ground. The lifts are deep and a little barrel-shaped; in this type this does not matter unless pronounced enough to rub the next outer lift dip.

While the holder is in the highest position we inspect all the upper portion of the guide-framing, top girders, paddon ties (if any), finials, &c. The painting gets special attention from us, as it rarely gets special attention at this height from the painters. Next the roof sheeting is inspected with top pressure on, searching first for leakages, some of which may be audible. A discolouring of the painted surface is also an indication of leakage where oil is held in the gas. Any corrosion at the edges of the laps should be carefully cleared away or it will accumulate and burst off the small rivets. Is there any depression around the circular centre plate? If this is so, rainwater will be held there and corrosion encouraged. In such cases I have recommended thorough scraping of the parts and the use of " Bituproof " liquid mixed with builders' sand for restoring the watershed, giving two coats of the liquid alone as a finish. Gasholders so treated are permanently cured. We will next carefully inspect the construction of the top curb, including the strong plates riveted to it. If it is really strong and in fact a rigid, triangular girder, the guide wheels of the top carriages must be set just clear of the guides while the holder is fully inflated in hot weather. If, on the other hand, the top curb is flexible and the angle formed by the meeting of roof sheets and side sheets is opened by the increasing pressure of the gas—in other words, if the roof sheeting lifts off its framing right up to the curb—then we shall probably decide to set the guide wheels just free of the guides when the outer lift is landed. This will leave the wheels still in contact when fully up, but they will be riding on a gas cushion. Naturally, we shall endeavour to get every wheel contributing to the guiding and distribution of strains evenly all round the gasholder. If I remember correctly my reading of " The Guide Framing of Gasholders," by F. S. Cripps, he says that a top curb of a large gasholder will probably decrease in diameter by something less than an eighth of an inch as a result of the compressive pull of the inflated roof sheeting " and the top guide wheels should be set accordingly."

The particulars we shall require at each top carriage are as follows: The distance of heel of top curb to the wheel path; the position of wheels, radially and tangentially relative to their guides; state of the axles; whether axles turn in the carriage cheeks; whether there is indication of regular oiling. The most worn axle will, in all probability, be hard pressing its wheel against the guide, in that case it must be eased off, as that is the axle to inspect. We now return to the tank top to inspect the guide carriages on the bottom of the outer lift—there will be more of these than of any other circle of carriages. The inspector must examine the carriages in the water, as we shall require the following information: Distance, side sheeting to wheel path; position of wheels; state of the axles; whether the cheeks are clear of the flanges of the tank guides; distance from surface of tank water to top of tank; how many rivet spaces the lift is sunk into the water. Having tabulated this information, start the deflation of the gasholder, and while it is coming down the side-sheets are thoroughly scrutinized for traces of corrosion, defective painting, and leakages. There are two examinations to make before the outer lift is landed. First, we must test the topmost dip for strength, and it is desirable to get that dip where a tier of girders can act as a handrail. Place a spirit level across the channel section forming the dip and ascertain whether it is level; if the inner edge is one-eighth or more high all round, then the dip is springing and throwing the carriage wheels outward, probably causing the axles to wear excessively. The points to try for level are at each carriage and halfway between them.

Returning to the tank top, we inspect the dip carriages before it uncups, getting the usual particulars with the addition of distance from inner edge of dip to the side sheeting of the next lift. Having found the high side of the gasholder—most of them have a slight tilt—take your stand there and watch the outer lift uncup. As it does so the sealing water in the cup will descend with it until it is joined by the overflow from the tank: if this is delayed too long there will be a loss of gas indicated by a decided agitation of water. There is no excuse for loss of gas in

this way from gasholders less than 20 years old. It is important that the position of the top guide wheels be inspected again now to learn the effect the loss of the weight of the outer lift has had. If the topmost dip was found weak, its carriage wheels will now be found to be less hardly pressed on to their guides. The guide framing is inspected as the roof passes it in descent. We repeat with the remaining lifts the collecting of the particulars and so complete the gasholder.

Large-scale plans are made of the lifts and tank with a view to arriving at a compromise with errors of form, for it is impossible to get lifts, tank, and guide-framing truly circular and concentric. Having decided on the adjustments necessary to put the whole into a free yet perfectly controlled state, commence by carrying out one-half of this only. Having carried out this first adjustment, wait until all the lifts have landed (it is not necessary to land the inner lift) and cupped up again at least six times before you attempt any further adjustment—it may be a year before this can be carried through; if *two* years are spent in getting the best possible condition it will be time well spent and the result will be a gasholder of perfectly free action and longest possible life.

Corrosion.

Many papers have been read and books published on this subject, so I shall deal with it in its relation to gasholders only. Design is sometimes to blame, as when pockets, narrow spaces, and long-spaced rivets make it impossible to keep the surfaces free of the enemy by cleaning and painting. There are a few contributory conditions to corrosion which, I imagine, are not generally suspected. For instance, the atmosphere around a gas-works is often charged with corrosive elements from the gas-works itself and also from surrounding sources—if the foul oxide is revivified in the neighbourhood this is a decidedly free source of contamination. From such an atmosphere there is deposited on the whole of the holder sheeting an impalpable film. Then comes rain and washes this into the cups and tank, where it floats on the water surface assisting in the well-known damage always wrought there. Later it becomes, in a somewhat weakened state, part of the mud in the cups and on the bottom curb, and there accounts for the corroded groove so often found at the edge of the sectional bars there, cutting through the sheets. With this in mind I look with suspicion on the practice of reversing laps of sheets so that they catch this corrosive. For the same reason, it is always unwise to allow silt to remain for long periods in the cups or on projections lower down. The second suspected condition is really not among the suspects with me, it is a "Proved Guilty," and takes the form of badly-rolled sheets—foreign matter in the form of slag, scale, shreds of metal, &c. If these get on to the upper surface of a sheet when it is very hot and being rolled to gauge at the mills, they become embedded into the surface so firmly as to present a surface apparently perfectly homogeneous. When such a sheet becomes wet, the dampness penetrates where the paint cannot and immediately commences to lift out the embedded foreigner. Recently I inspected a gasholder where such sheets had been used and found that it was possible to detach pieces about the weight of a threepenny piece. When these were dislodged they left deep depressions with sheeting of original thickness surrounding them. This fault is one which can be avoided by intelligent inspection of sheets at the mills or before they are built into the holder.

The third adverse condition is more subtle and will, I am sure, prove very interesting to follow. When on the technical staff of a prominent firm of gas-plant manufacturers, I was sent to inspect a five million capacity gasholder. Its sheeting was the troublesome feature, about three-fifths of it being corroded through in small holes which could be repaired by ⅝-in. bolts with a large washer on each. The puzzling feature was that one part of the surface of the sheet only was affected, while the centre portion and the other end were in perfect condition. Another phenomenon was that two-fifths of the sheets were not affected at all. For many days this puzzled me, until one day in the works I watched the sheet leveller at work and was surprised to notice that his hammer marks were disposed on the one-half of the sheets in a way remarkably resembling the disposition of the corroded holes. In an instant the problem was solved. The corroded spots were where the hammer had crystallized the metal, and as a consequence I had to provide a less injurious method of levelling. I inspected hydraulic pulling machines but did not like them. Eventually a special rolling machine was made with small, closely placed rolls; this was entirely successful and brutal hammering is no longer necessary at those works.

The fourth of these adverse conditions is shock or vibration. The evidence is overwhelming both in its frequency and its certainty. One of the many proofs is given: I was called to inspect a large gasholder in the Eastern Counties, a few miles from the sea. The engineer showed me the corroded part and said, "There have been defective sheets used there; none of the others has corroded anything like them." Being left to inspect for myself, I climbed the latticed standard close to the fault and investigated for a long time without any solution presenting itself to me. I was the more puzzled because the fault was not on the sea side. Then, suddenly, the standard and the adjacent sheeting vibrated violently. Some little investigation revealed the cause—a joint plate (or fish plate) on the standard guide had been put on back to front and was projecting beyond the front of the channel bar guide, and the nose of the carriage was fouling it each time it passed up or down. This is a case unlikely to occur many times, but the point to remember is that friction is destructive.

My last of these conditions is painting on a surface not perfectly dry. It is impossible to wipe a surface dry enough for painting. The practice of painting a gasholder while it is being inflated lends itself to grave abuse. A steel surface should have not less than half-an-hour to dry in fair weather, yet I have seen painters covering a surface which fifteen minutes previously was submerged. When holders have to be painted as they ascend, the painters should be on a platform at least 3 ft. high. The distance the sheets would then have to travel before reaching the painter would improve the condition of its surface in this respect.

Repairing Corroded Sheets.

It is neither good engineering nor true economy to have holes corroded through gasholder sheets in any part that is accessible for patching. A patch should be put over corrosion as soon as it has penetrated halfway through the sheet. To patch by putting bolts into a hole which has corroded through is literally taking hold of next to nothing, and in a year or two the patch, together with the bolt and part of the rust it has been attached to, can be picked up with the fingers. Bolts securing patches should be well away from the weakened part. A system of patching introduced by me provides substantial bolts which, with the patch, strengthen the sheet to more than its original strength.

Many kinds of the repair bolts used to-day will not last two years in some gases, while another kind leak from the time they are put in, unless special precautions be taken.

Discussion.

Mr. J. H. WAINWRIGHT (President) said they had listened with great interest to Mr. Bott's lecture. There were many points to remember, but the one that had impressed him most was the information given in regard to oiling. Mr. Bott's remarks on this point, his examples of bad oiling, and the methods to be adopted in order to rectify the trouble would be most helpful. The Author had mentioned one type of oil or paint, and he wondered if he had any experience of non-drying paints which could be poured into the cup so that the holder painted itself when it rose and fell. He asked if Mr. Bott knew of a jointing material which would withstand the presence of oil and could be used under the conditions which would be found on a C.W.G. relief holder. He also asked if oil filming was considered as good a preservative as paint on the sides of the holder, as he understood this was practised to a considerable extent on the Continent.

Mr. F. A. JENKINS (Leamington), in proposing a vote of thanks, said that Mr. Bott had given them the benefit of his unique experience. He agreed with him that ornamental rosettes on gasholder girders were a constant source of trouble. Referring to the lubrication of the interior rollers of the holder, he said it seemed the height of optimism to expect a roller which was in and out of water to remain good for perhaps a quarter of a century, and asked if there were any method of treating the rollers or any special metal from which they could be made and so prevent corrosion.

Mr. W. T. HOBSON (Wolverhampton), who seconded the vote, said that Mr. Bott had dealt very thoroughly with the question of holder maintenance, and had given positive information from his long and varied experience in that type of work. He was pleased that he had mentioned the recommendations made by the Gasholder Sub-Committee of The Institution of Gas Engineers, which had been reported in the Technical Press. These were given as a guide to gas engineers, and he thought that if inspections were carried out periodically, gasholders would be all the better for it. The Author had not mentioned the question of internal corrosion, and he wondered if he had come across any signs of such corrosion in gasholders. With regard to external corrosion, he asked if he had found that corrosion was most marked on the side sheets and outside of steel tanks on the south-east side of the holder. He also asked if the Author was still of opinion that red lead was the best thing to use for a first coat on a gasholder.

Mr. GARDNER (Birmingham) said he had not noticed internal corrosion in coal gas holders but had found it with holders containing blue gas. Referring to the question of lubrication, in his opinion the Stauffer lubricator was not as good as the grease

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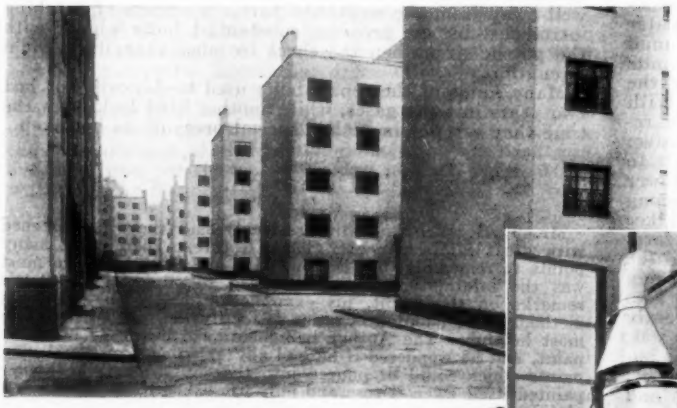
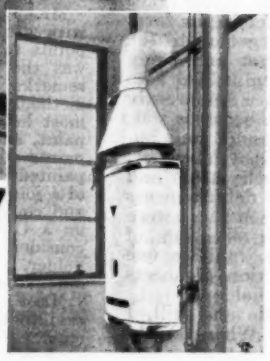
Each flat is fitted with an "ASCOT" Multi-Point Gas Water Heater, as shown in the lower illustration.





PART OF THE KITCHEN

THOUSANDS & THOUSANDS of HOUSES & FLATS are fitted with the "ASCOT" HOT WATER SYSTEM

ASCOT GAS WATER HEATERS LIMITED

244, HIGH HOLBORN, LONDON, W.C.1

Telegrams: GASCOT, LONDON *Phone: HOLBORN 7107 (4 LINES)*

Works: NORTH CIRCULAR ROAD, NEASDEN, LONDON, N.W.10

SOLVE EVERY DOMESTIC WATER HEATING PROBLEM

gun and nipple method. They used the latter very effectively in Birmingham.

Mr. R. A. WESTWOOD (Oldbury) asked if the rails of spirally-guided holders were bent in jigs or if the erector relied upon his eye only. He referred to the fact that in erecting holders tape soaked in red lead was often used for caulking the joints, but he had found that when hot riveting the heat was so intense that the tapes were burned and led to leakage. This, of course, was not so when cold riveting was done.

Mr. F. L. ATKIN (Birmingham) said he would like to know why it was not possible to electrically weld a patch on a gas-holder. With regard to the painting of holders, he suggested that the use of a paint spray might help to get the paint into the crevices and so prevent rust.

Mr. E. L. WALLIS (Wolverhampton) asked if benzole washing of gas increased the interior corrosion in holders.

Mr. F. BENGOUGH (Birmingham) asked if the Author had had any experience in regard to oil filming of gasholders.

The Author's Reply.

Mr. BOTT, in reply, said he had had no experience with a non-drying paint with the exception of "Humadine." In using this it should be remembered that it liberated rust and, therefore, should not be put on where rust was in a very advanced stage. With regard to jointing material, he found that a mixture of one-third red lead and two-thirds cement gave a much better joint than neat red lead.

Oil filming was a good thing inside a gasholder, and in his opinion corrosion did take place inside a coal gas holder. He thought that the present-day method of steaming retorts and oxide purification were two contributory causes.

With regard to the lubrication of inside rollers, he said that the present practice with gasholders of any size was to place the carriages underneath the cup, and they were thus able to make them more substantial. They were constantly in and out of the water and this had a lubricating effect and they lasted longer than those which were always dry.

He had found it very effective to mix graphite with the oil used for lubricating purposes.

One of the charms of gasholder inspection was that something different was found in regard to each holder, and one always had to be prepared for something unexpected. In inland towns he found that corrosion took place on the north-east side of the holder, while near the sea corrosion was on the side facing the sea. Red lead was the best coating to give next to the metal, but it should be mixed with some binding material.

In his opinion, a gasholder should be inspected more than once a month, and he recommended at least a fortnightly inspection.

The spiral rails on a spirally-guided holder were bent to a gauge. He considered that if the jointing tape was the proper width it should not be burned when hot riveting took place.

He did not like spray painting. In order to spray, the "guts" had to be taken out of the paint and he did not think it penetrated any better than, if so well as, when put on with a brush.

Stewarts & Lloyds, Ltd.

In their statement for the past year the Directors of Messrs. Stewarts & Lloyds, Ltd., report a gross profit of £1,004,000. For 1933 the Company returned a profit of £615,877, against only £287,023 for 1932. Earnings in each case are shown before providing for depreciation, income-tax, and reserves. A year ago the Company, after making such provisions, which included £150,000 to general reserve, resumed dividends on the deferred shares with a payment of 2½%. They now propose to pay a dividend of 5%.

Allocations for depreciation, reserves, &c., are not disclosed in the preliminary statement, but as the additional dividend absorbs only £116,000 and gross profits were nearly £400,000 larger it seems clear that after providing for a heavier income-tax requirement the Board are making a liberal addition to the Company's working resources.

Gas Undertakings' Results for 1934

Thirsk.

At the annual meeting of Thirsk Gas Company it was decided to pay a dividend of 2½% for the half-year, making, with the interim dividend, 5% for the year. A balance of £81 was carried forward.

Wrexham.

At the annual meeting of the Wrexham Gas Company, Mr. Charles Murless, who presided, said 475 additional consumers had been connected up during the year, and the total consumers now numbered over 11,800. New appliances supplied and fixed included 267 cookers, 112 washboilers, 344 boiling rings, 271 gas fires, and a large variety of other apparatus.

THE
STANTON-WILSON
SELF-ADJUSTING PIPE JOINT

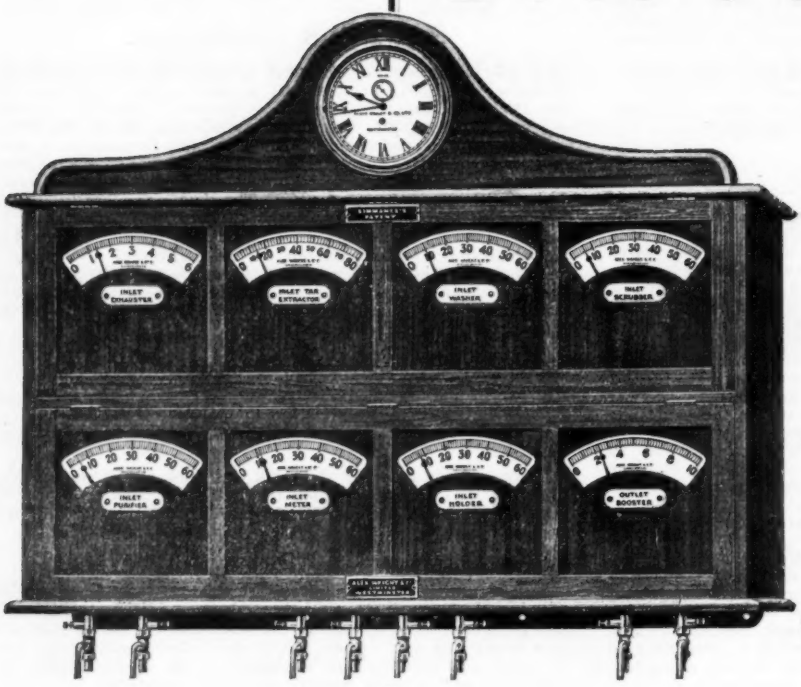
THE STANTON-WILSON SELF-ADJUSTING PIPE JOINT enables over 500 miles of spun iron mains to adjust themselves to the subsoil movements caused by ground subsidence and traffic vibration. Owing to the flexibility of the joints, these mains were laid with very few specials.

THE STANTON IRONWORKS COMPANY
LIMITED, Nr. NOTTINGHAM

BATTERIES

of

DEAD - BEAT INDICATORS



combine technical perfection - - - with handsome appearance - - -

Indicating and recording units can be incorporated in any number and for any ranges of vacuum, pressure or combination of vacuum and pressure. Cabinet work is of highest quality and finish, and is carried out in oak, mahogany or other hardwood to match or harmonise with surroundings.

DESIGNS SUBMITTED OR BATTERIES CONSTRUCTED TO APPROVED SPECIFICATIONS.

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Telephone: VICTORIA 1207

WESTMINSTER, S.W.1

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Gas Markets and Manufactures

Stock Market Report

(For Stock and Share List, see later page)

Business on the Stock Exchange last week was again of small dimensions, though markets on the whole were healthier than for the previous fortnight. The chief feature was a general recovery in British Funds subsequent to the favourable impression created by the 1934-35 Budget figures, though apart from heavier purchases on foreign account there was comparatively little business done, the appreciations being brought about mainly on account of confidence in British financial stability. Home rail junior stocks also improved on hopes of better traffic returns, and a number of industrials recovered under the stimulus of further encouraging annual reports.

There were no outstanding items of interest in the Gas Market, though the volume of business was a trifle heavier than the previous week. Prices on the whole remained fairly steady, and it is satisfactory to note that a cessation has been made in the recent wholesale marking down of values. It is true a few leading stocks were inclined to weaken, but the quotations of these closed unchanged. A demand set in for Imperial Continental stock, and the price fully recovered the 10 points lost the week before, while some activity on the local Exchange brought about a small upward movement in Newcastle units.

The first accounts of the Severn Valley Gas Corporation show a net profit for the year to March 31 of £16,643. After providing for the preference dividend, the Directors propose to distribute a dividend of 5% for the year on the ordinary and deferred shares, leaving £2,022 to be carried forward. The ordinary shares have been changing hands at round about 22s. 3d., so that the yield on the basis of the above dividend is £4 9s. 10d.%.

The British Gas Light and Coke Company, Ltd., has sold £200,000 3½% redeemable debenture stock to Messrs. Cohen, Laming, Hoare at 98 7/16% net. The stock will rank *pari passu*, except as to date of redemption, with the existing 4% and 5% debenture stocks, and will be repaid at par on July 1, 1955. Interest is payable half-yearly on Jan. 1 and July 1, the first payment in July next being 17s. 6d.% for three months.

Current Sales of Gas Products

The London Market for Tar Products.

LONDON, *April* 8.

There is little change to report in the prices of tar products, which are as follows:

Pitch, about 40s. per ton f.o.b.

Creosote, 5½d.

Refined tar, 4d. per gallon in bulk at makers' works.

Pure toluole, 2s. 1d. to 2s. 3d.; pure benzole, 1s. 7d. to 1s. 8d.; 95/160 solvent naphtha, 1s. 5d.; and 90/160 pyridine, about 5s. 9d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

April 8.

The average prices of gas-works products during the week were: Gas-works tar, 20s. to 25s. Pitch—East Coast, 39s. to 41s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 39s. to 41s.* Toluole, naked, North, 1s. 8d. to 1s. 9d. Coal-tar crude naphtha, in bulk, North, 6½d. to 6¾d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 4¾d. Heavy naphtha, North, 9¾d. to 10¾d. Creosote, *ex* works, in bulk, North, liquid and salty, 4½d. to 4⅝d.; low gravity, 4½d. to 4⅝d.; Scotland, 4½d. to 4⅝d. Heavy oils, in bulk, North, 4d. to 4¼d. Carbolic acid, 60's, 2s. to 2s. 1d. Naphthalene, £10 to £11. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *April* 6.

Export business is, to a great extent, hampered by the foreign currency situation. Distillers are, however, maintaining quotations at about previous levels.

Crude gas-works tar.—Actual value remains at 29s. to 31s. per ton *ex* works in bulk.

Pitch is purely nominal at 40s. to 42s. per ton f.o.b. Glasgow for export, and 40s. per ton *ex* works in bulk for home trade.

Refined tar is still quoted at 3d. to 3⅛d. per gallon naked at makers' works.

Creosote oil.—Stocks are well looked after, and available supplies command not less than the following prices: B.E.S.A. Specification, 4⅞d. to 5⅛d. per gallon; low gravity, 4⅞d. to 5⅛d. per gallon; and neutral oil, 4⅞d. to 5d. per gallon; all f.o.r. in bulk.

Cresylic acid is uninteresting, and prices are a little unsteady. Pale, 97/99%, 1s. 3d. to 1s. 4d. per gallon; dark, 97/99%, 1s. 1d. to 1s. 2d. per gallon; and pale, 99/100%, 1s. 4d. to 1s. 5d. per gallon; all *ex* works.

Crude naphtha is valued at 4¼d. to 4⅜d. per gallon, according to quality and district.

Solvent naphtha.—90/160 grade is now quoted at 1s. 3½d. to 1s. 4½d. per gallon, but 90/190 heavy is unchanged meantime at 10d. to 11d. per gallon.

Motor benzole continues rather quiet with prices called 1s. 2½d. to 1s. 3½d. per gallon in bulk *ex* works.

Pyridines.—90/160 grade is 5s. 6d. to 6s. per gallon, and 90/140 grade 6s. to 6s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole . . .	0	8½	to	0	9	per gallon at works
Motor ,, . . .	1	2	,,	1	2½	,, ,, ,,
90% ,, . . .	1	3	,,	1	3½	,, ,, ,,
Pure ,, . . .	1	6½	,,	1	7	,, ,, ,,

Contracts Advertised To-Day

Coal.

Llandudno Urban District Council. [p. 113.]
Ulverston Urban District Council. [p. 113]

Gasholder Resheeting.

Stockton-on-Tees Gas Department. [p. 113.]

Oil, Gas.

Shipley Gas Department. [p. 113.]

Oils, Lubricating, &c.

Stockton-on-Tees Corporation. [p. 113]

Pipes.

Shipley Gas Department. [p. 113.]

Trade Notes

Monel Metal.

Monel Metal is now very widely used in a great variety of industries, particularly on account of its corrosion-resisting qualities, and Messrs. G. J. Weir, Ltd., Engineers, Cathcart, Glasgow, S. 4, have kindly forwarded us a copy of their leaflet on Castings and Forgings in the metal.

Industrial Gas Equipment Bulletin.

We are indebted to the Selas Gas and Engineering Company, Ltd., Selas Works, Manchester, 15, for a copy of their booklet, "The Industrial Gas Equipment Bulletin." It is hoped to establish a regular information service on the almost infinite subject of industrial gas uses and equipment by further publications of this nature, and so avoid the delays that have previously occurred in publishing illustrations and descriptions of frequent new additions to the already extensive range of "Selas" appliances.

Engineering Orders for Manchester.

Indications of an improved outlook in the engineering industry are reflected in the order books of Crossley Brothers, Ltd., of Openshaw. Among recent contracts are orders for further heavy oil fuel engines for the British Broadcasting Corporation. The two new engines are required for the North Scottish and North-East England Broadcasting Stations. Each will be of the latest high-efficiency, 6-cylinder, 6-crank Crossley vertical Diesel type, of 600 B.H.P., and will be similar to the Crossley sets already installed by the B.B.C. at Broadcasting House, London, and at the Scottish and the West Regional Stations. Engines built by Crossley Brothers, Ltd., and by their associated Company, Crossley-Premier Engines, Ltd. (formerly the Premier Gas Engine Company, Ltd., Nottingham), are to be found in every corner of the world.

Whatever the size of works, the best modern practice is represented by

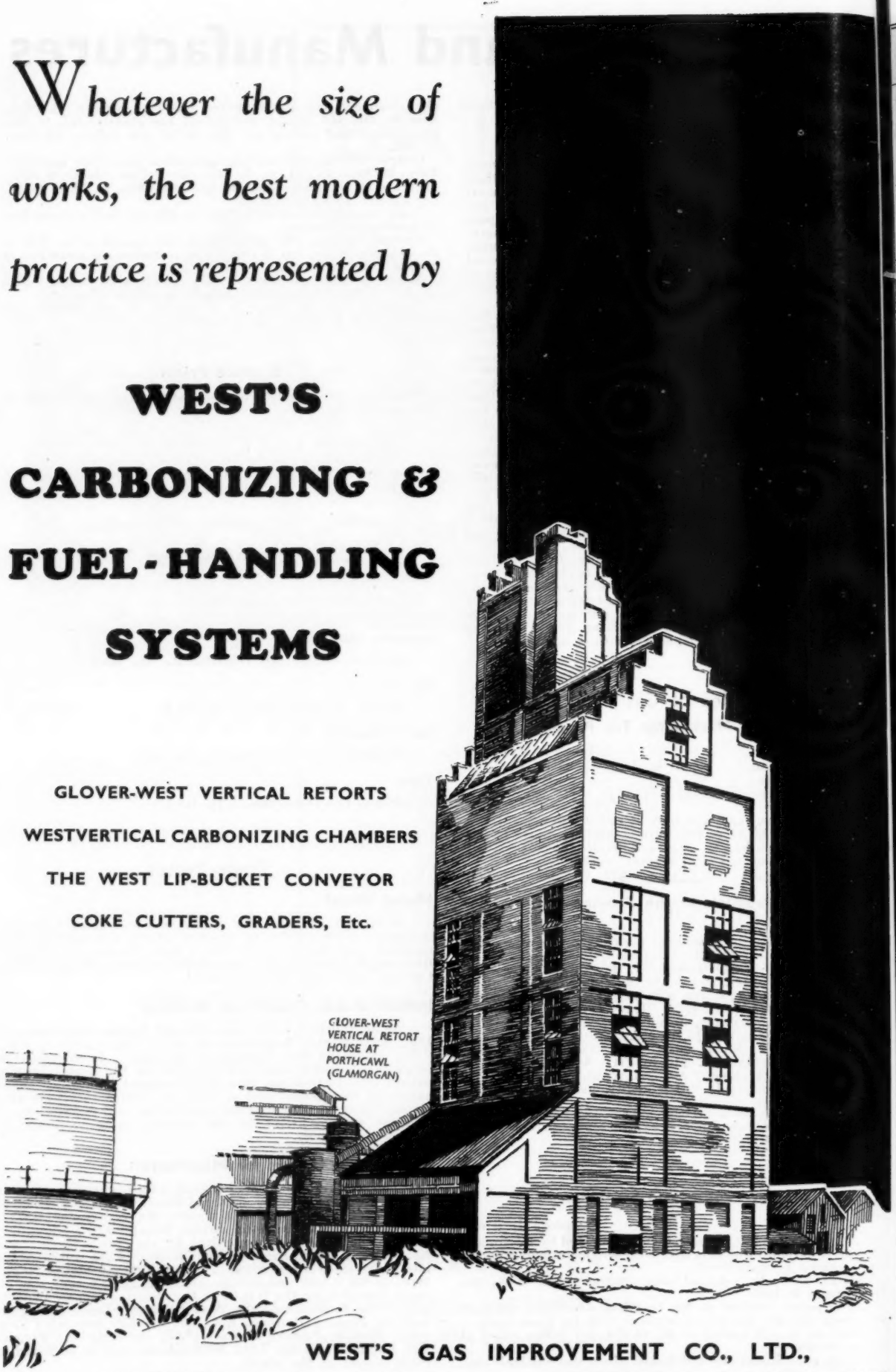
WEST'S CARBONIZING & FUEL-HANDLING SYSTEMS

GLOVER-WEST VERTICAL RETORTS

WESTVERTICAL CARBONIZING CHAMBERS

THE WEST LIP-BUCKET CONVEYOR

COKE CUTTERS, GRADERS, Etc.



GLOVER-WEST VERTICAL RETORT HOUSE AT PORTHCAWL (GLAMORGAN)

WEST'S GAS IMPROVEMENT CO., LTD.,

MANCHESTER: Albion Ironworks, Miles Platting.
Telephone: Collyhurst 2961

LONDON: Regent House, Kingsway, W.C.2
Telephone: Holborn 4108

STOCK AND SHARE LIST

Official Quotations on the London and Provincial Stock Exchanges

Issue. £	Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, April 5.	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,551,868	Stk.	Mar. 11	7	7	Alliance & Dublin Ord. ...	125—135	...	130½—131½
374,000	,,	Dec. 17	4	4	Do. 4 p.c. Deb. ...	90—100	...	...
557,655	,,	Feb. 18	7	7	Barnet Ord. 7 p.c.	165—170	...	166—167½
300,000	1	Oct. 8	1/9⅜	1/4½	Bombay, Ltd.	29/—31/-	...	...
178,480	Stk.	Feb. 18	9½	9½	Bournemouth sliding scale ...	220—230	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	167—172	...	165
439,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	147—152	...	...
50,000	,,	Dec. 17	3	3	Do. 3 p.c. Deb. ...	86—91	...	..
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	104—109	...	..
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	125—130	...	...
357,900	,,	Feb. 18	7½	7½	Brighton, &c., 6 p.c. Con. ...	170—175	...	...
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	153—158	...	...
205,500	,,	,,	6	6	Do. 6 p.c. B. Pref.	145—150	...	147
1,487,500	,,	Feb. 4	5	5	Bristol, 5 p.c. max.	118—120*a*	−½	..
120,420	,,	Dec. 17	4	4	Do. 1st 4 p.c. Deb. ...	102—104*a*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	102—104*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	122—124*a*	...	...
855,000	,,	Mar. 11	7	8	British Ord.	155—160	−4½	155½
100,000	,,	Dec. 17	7	7	Do. 7 p.c. Pref.	160—165	...	...
350,000	,,	,,	5	5½	Do. 5½ p.c. "B" Cum. Pref.	114—119	...	117
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	97—102	..	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	111—116	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1—3	...	...
150,000	Stk	Dec. 17	4½	4½	Do. 4½ p.c. Deb. ...	88—93		90½
626,860	,,	Jan. 21	6	6	Cardiff Con. Ord.	130—135	...	...
237,860	,,	Dec. 17	5	5	Do. 5 p.c. Red. Deb.	105—110	...	...
157,150	,,	Feb. 4	5	6½	Chester 5 p.c. Ord.	111—116*b*	...	...
98,936	1	Mar. 25	2/-	2/-	Colombo, Ltd., Ord.	1⅝—1¾*	...	...
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref. ...	20/6—22/6*	...	...
609,204	1	Mar. 25	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	20/—22/-*	...	...
296,053	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	24/6—26/6*	...	...
1,775,005	Stk	Feb. 4	5	6	Commercial Ord.	114—119	...	114—116½
475,000	,,	Dec. 3	3	3	Do. 3 p.c. Deb. ...	83—88	...	...
286,344	,,	Feb. 18	5	5	Do. 5 p.c. Deb. ...	123—128	...	123—124½
807,560	,,	Feb. 18	7	7	Croydon sliding scale... ...	155—160	...	157½—159
569,590	,,	,,	5	5	Do. max. div.	112—117	...	114
620,385	,,	Dec. 17	5	5	Do. 5 p.c. Deb. ...	125—130	...	125—127
542,270	,,	Feb. 18	7	10	Derby Con.	185—195*c*	−5	...
55,000	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	100—105*c*	...	...
239,000	,,	Feb. 4	5	5	East Hull Ord. 5 p.c. ...	111—116	...	...
181,625	,,	Feb. 4	6	6	East Surrey Ord 5 p.c. ...	131—136	...	...
175,609	,,	Dec. 17	5	5	Do. 5 p.c. Deb. ...	120—125	...	...
1,002,180	,,	Mar. 11	†	†7	European, Ltd.	111—116	...	112—112½
19,313,481	,,	Feb. 4	5⅝	5⅝	Gas Light & Coke 4 p.c. Ord.	25/—26/-*f*	...	25/—25/4½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	85—90	...	87½—88
4,477 106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	104—109	...	104½—106½
6,102,497	,,	Dec. 3	3	3	Do. 3 p.c. Con. Deb. ...	87—92	...	89½—90½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	115—120	...	...
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	111—116	...	112—113¾
270,466	,,	Feb. 18	6	6	Harrogate New Cons. ...	135—140	...	...
140,000	1	Mar. 25	1/7½	1/7½	Hongkong & China, Ltd. ...	1¼—1¾*	...	...
213,200	Stk.	Feb. 18	6	6	Hornsey Con. 3½ p.c.... ...	128—138	...	...
5,600,000	,,	Oct. 22	14	10	Imperial Continental Cap. ...	200—210	+10	195½—209
223,130	,,	Jan. 21	3½	3½	Do. 3½ p.c. Red. Debs.	91—96	...	...
285,242	,,	Feb. 18	8½	8½	Lea Bridge 5 p.c. Ord. ...	172—182	...	...
2,167,410	,,	Feb. 18	6	6	Liverpool 5 p.c. Ord.... ...	134—138*b*	...	...
245,500	,,	Dec. 17	5	5	Do. 5 p.c. Red. Pref. ...	105—110*b*	...	...
306,083	,,	Jan. 16	4	4	Do. 4 p.c. Deb.	104—107*b*	...	...
165,736	,,	Feb. 18	8	10	Maidstone 5 p.c. Cap. ...	185—195	...	...
63,480	,,	Dec. 17	3	3	Do. 3 p.c. Deb. ...	83—88	...	...
75,000	,,	Dec. 3	†10	†10	Malta & Mediterranean ...	205—215	...	...
392,000	—	Apl. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	100—105*	−2	...
231,978	Stk.	Feb. 4	5	5	M. S. Utility "C" Cons. ...	110—115	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	102—107	...	105—105½
360,075	,,	Dec. 17	4	4	Do. 4 p.c. Deb. ...	102—107	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	125—130	...	...
125,000	—	Jan. 2	11/8	3½	Do. 3½ p.c. Rd. Rg. Bds.	98—101	...	...
675,000	,,	May 28	†6	†3	Montevideo, Ltd.	50—60	...	51
2,061,315	,,	Feb. 18	5	5⅝	Newcastle & Gateshead Con.	24/3—25/3*df*	+-/3	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	106—107*d*	...	...
776,706	,,	Dec. 17	3½	3½	Do. 3½ p.c. Deb. ...	101½—102½*d*	...	...
277,285	,,	Oct. 8	5	5	Do. 5 p.c. Deb. '43 ...	105—107*d*	...	...
274,000	,,	Feb. 4	5	5	Newport (Mon.) 5 p.c. max....	108—110*a*	...	...
225,000	,,	Feb. 18	7½	7½	North Middlesex 6 p.c. Con.	170—175	...	...
396,160	,,	Feb. 4	5	5	Northampton 5 p.c. max. ...	105—110	...	...
300,000	,,	Nov. 5	†7	†9	Oriental, Ltd.	170—175	...	...
416,617	,,	Dec. 17	8	8	Plym'th & Stonehouse 5 p.c.	168—173	...	...
504,416	,,	Feb. 4	8	8½	Portsm'th Con. Stk. 4 p.c. Std.	173—178	...	175—176
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	110—115	...	...
114,000	,,	Jan. 21	5	5	Preston 5 p.c. Pref.	108—113	...	...
1,736,968	Stk.	Feb. 18	6	6	Sheffield Cons.	140—142*e*	...	...
95,000	,,	Jan. 7	4	4	Do. 4 p.c. Deb.	103—106*e*	...	...
133,201	,,	Feb. 18	8½	5	Shrewsbury 5 p.c. Ord. ...	142—147§	...	...
90,000	10	May 28	†4	†3	South African	3—4	...	...
1,061,779	1	Sept. 10	1/2⅜	1/2⅜	South East'n Gas Cn. Ld. Ord.	27/—29/-	...	28/—28/3
945,016	1	Mar. 11	-/10½	-/10½	Do. 4½ p.c. Red. Cum. Pref.	22/—23/-	...	22 —22/1½
450,000	Stk.	Feb. 4	74/4	4	Do. 4 p.c. Red. Deb. ...	100—103	...	...
6,709,895	,,	Feb. 4	5	6½	South Met. Ord.	120—125	...	120½—124½
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf. ...	147—152	...	149½
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	103—108	...	105—107
1,895,445	,,	Dec. 17	3	3	Do. 3 p.c. Deb. ...	86—91	...	87½—88½
1,000,000	,,	Jan. 7	5	5	Do. 5 p.c. Red. Deb....	113—118	...	...
209,820	,,	Feb. 18	8½	8½	South Shields Con.	174—176*d*	...	...
1,543,795	,,	Feb. 18	6	6	South Suburban Ord 5 p.c. ...	128—138	...	128—130
512,825	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	120½—122½
500,000	,,	,,	4	4	Do. 4 p.c. Pref. ...	102—107	...	...
888,587	,,	Dec. 17	5	5	Do. 5 p.c. Deb. ...	124—129	...	124—126
250,000	,,	,,	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
647,740	,,	Feb. 4	5	5	Southampt'n Ord. 5 p.c. max.	114—119	...	...
121,275	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	102—107	...	...
350,000	,,	Feb. 4	5½	5½	Swansea 5½ p.c. Red. Pref. ...	113—118	...	117½—118½
200,000	,,	Dec. 17	6½	6½	Do. 6, p.c. Red. Deb. ...	100—105	...	...
1,076,490	,,	Feb. 18	6½	6½	Tottenham and District Ord.	148—153	...	148
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	131—136	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	120—125	...	...
199,005	,,	Dec. 3	4	4	Do. 4 p.c. Deb. ...	103—108	...	...
369,774	,,	Feb. 4	7	7	Uxbridge, &c., 5 p.c.	150—155	...	...
108,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	118—123	-2	118
1,326,700	,,	Feb.	7	7	Wandsworth Consolidated ...	152—157	...	152—156
1,371,373	,,	,,	5	5	Do. 5 p.c. Pref. ...	121—126	...	123½—126
1,317,964	,,	Dec. 17	5	5	Do. 5 p.c. Deb. ...	126—131	...	130
208,300	,,	,,	26/8	4	Do. 4 p.c. Deb. ...	104—109	...	...
158,400	,,	Feb. 18	5	6*g*	Winchester W.& G. 5 p.c. Con.	116—121	...	...

Quotations at :—*a*.—Bristol. *b*.—Liverpool. *c*.—Nottingham. *d*.—Newcastle. *e*.—Sheffield. *f*.—The quotation is per £1 of stock. *g*.—Paid £3, including 10s. on account of back dividends. * Ex. div. † Paid free of income-tax. ‡ For year. § Correction :—Shrewsbury Stock should have been marked 142—147 in last week's list.

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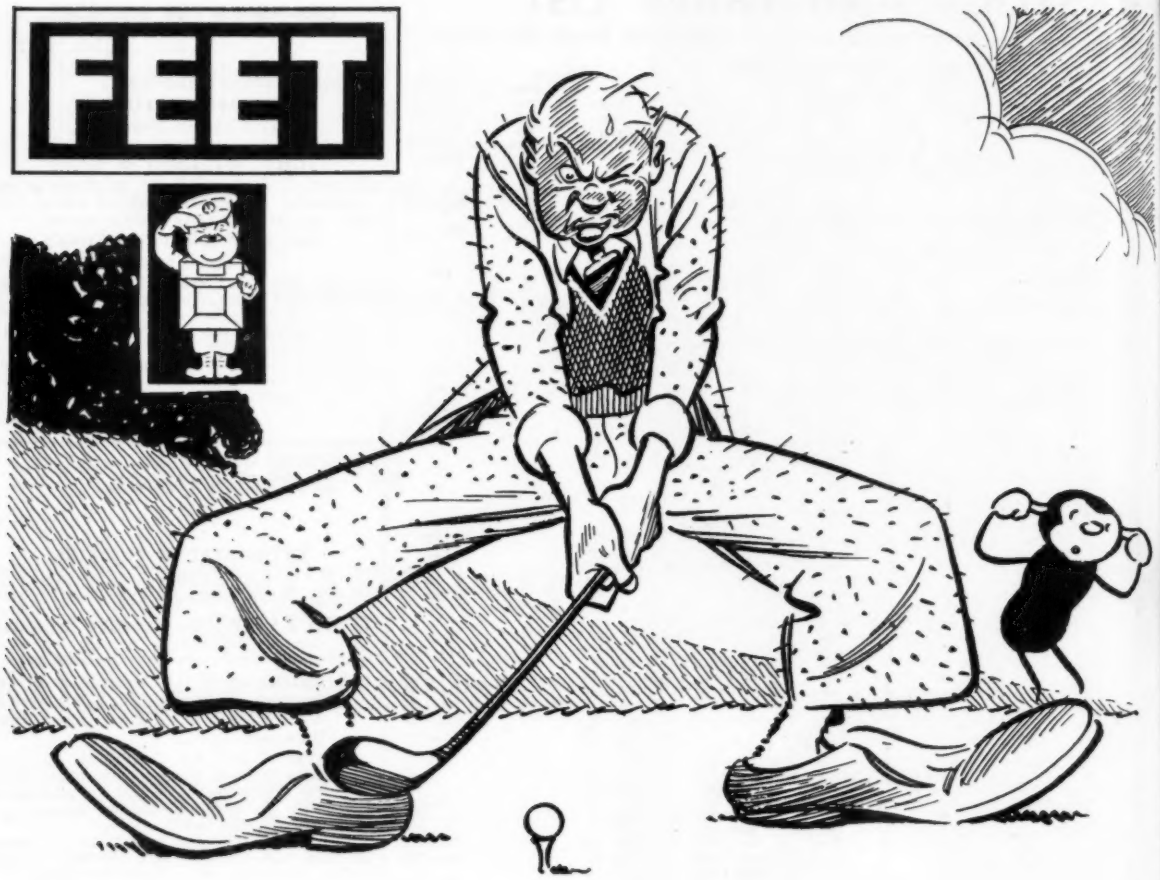

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